TEST REPORT

Application No.....:	S20230417894001
Applicant's name.....:	Lumi United Technology Co., Ltd
Applicant's address:	Room 801-804, Building 1, Chongwen Park, Nanshan iPark, No. 3370, Liuxian Avenue, Fuguang Community, Taoyuan Residential District, Nanshan District, Shenzhen, China
Sample description::	Dual Relay Module T2
Model.....:	DCM-K01
Date of receipt of test item.....:	2023-04-13
Test location.....:	Building G9 , China Sensor Network International innovation Park, No.200, Linghu Avenue, Wuxi, Jiangsu, China
Test standard.....:	**ETSI EN 301 489-1 V2.2.3(2019-11)** **ETSI EN 301 489-17 V3.2.4(2020-09)** **EN 55032:2015+A11:2020** **EN 55035:2017+A11:2020** **EN IEC 61000-3-2:2019+A1:2021** **EN 61000-3-3:2013+A2:2021+AC:2022**
Test date(s).....:	2023-05-15
Test result.....:	The test results are in compliance with the above mentioned standards.
Date of issue.....:	2023-07-20

Compiled by:	**Reviewed by:**	**Approved by:**
Qianlan Sang	Amos Xia	Line Chen

FANGGUANG INSPECTION & TESTING CO.,LTD. APPROVED(07)

Other aspects:	N/A

Abbreviations: *P = passed; F = failed; N/A = not applicable*

The test result in this test report refers exclusively to the presented test sample. This report shall not be reproduced, except in full, without the written approval of FGTEST.

In China,this test report is only used for scientific research, teaching or internal quality control if there is no China Metrology Accreditation (CMA) mark.

Test item description.. :	Dual Relay Module T2
Trade mark.....:	Aqara
Manufacturer.....:	Lumi United Technology Co., Ltd
Manufacturer's address ..... :	Room 801-804, Building 1, Chongwen Park, Nanshan iPark, No. 3370, Liuxian Avenue, Fuguang Community, Taoyuan Residential District, Nanshan District, Shenzhen, China
Factory.....:	/
Factory's address.....:	/
Power supply Description..... :	Input: 100-250 VAC，10A

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1. TEST RESULT SUMMARY

Test Standard	Test Item	Test Method	Result (Pass/Fail)
Emission Measurements			
ETSI EN 301 489-1 (2019-11) ETSI EN 301 489-17 (2020-09) EN 55032:2015+A11:2020	Conducted Emission	EN 55032	Pass
	Radiated Emission	EN 55032	Pass
EN IEC 61000-3-2:2019+A1:2021	Harmonic Current Emissions	EN IEC 61000-3-2	Pass
EN 61000-3-3:2013 +A2:2021+AC:2022	Voltage Fluctuations and Flicker	EN 61000-3-3	Pass
Immunity Measurements			
ETSI EN 301 489-1 (2019-11) ETSI EN 301 489-17 (2020-09) EN 55035:2017+A11:2020	Electrostatic Discharge	EN 61000-4-2	Pass
	Radio-Frequency Electromagnetic Field	EN 61000-4-3	Pass
	Electrical Fast Transients	EN 61000-4-4	Pass
	Surges	EN 61000-4-5	Pass
	Radio-Frequency Common Mode	EN 61000-4-6	Pass
	Power Frequency Magnetic Field	EN 61000-4-8	Pass
	Voltage Dips & Interruptions	EN 61000-4-11	Pass
NOTE:/			

2. GENERAL DESCRIPTION OF EUT

2.1 BASIC DESCRIPTION OF EQUIPMENT UNDER TEST

Equipment:	Dual Relay Module T2
Model No.:	DCM-K01
Additional Model:	/
Power Supply Rating:	Input: 100-250 VAC,10A，2500W
Sample submitting way:	■Provided by customer □Sampling
Note:	1.This sample belongs to class B equipment, Both 110V and 230V voltages of the samples were evaluated, and only 230V was used as the worst mode in the report.

2.2 EUT TEST MODE

Test mode:	Mode 1: The EUT is connected to the load via a switch. The load is light bulbs, each bulb rated at 200W, a total of 13 bulbs connected.

Connection Diagram (Mode 1)

3. LIST OF USED TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Asset No.	Cali. Interval	Calibration Due	Use (√)
Radiated Emission						
Bi-Log Antenna	Rohde & Schwarz	HL562E	FWXGJC-2016-267-06	1 year	2024-03-10	☑
Broadband Horn Antenna	Rohde & Schwarz	HF907	FWXGJC-2016-267-07	1 year	2024-03-02	☑
High frequency horn antenna	Rohde & Schwarz	BBHA 9170	FWXGJC-2018-016	1 year	2024-06-04	□
Preamplifier	Rohde & Schwarz	SCU-18D	FWXGJC-2016-267-05	1 year	2023-11-17	☑
Preamplifier	Rohde & Schwarz	EMC184055SE	FWXGJC-2018-018	3 year	2025-04-13	□
EMI Receiver	Rohde & Schwarz	ESR26	FWXGJC-2016-267-01	1 year	2023-11-08	☑
Semi anechoic chamber	EMC	EMCCT-3	FWXGJC-2016-270	3 year	2025-06-07	☑
Conducted Emission						
EMI Receiver	Rohde & Schwarz	ESR3	FWXGJC-2016-181	1 year	2024-03-14	☑
L.I.S.N	Rohde & Schwarz	ENV216	FWXGJC-2016-182	1 year	2024-05-14	☑
L.I.S.N	AFJ	LT32C/10	FWXGJC-2016-179	1 year	2024-03-13	□
ISN	Rohde & Schwarz	NTFM 8158	FWXGJC-2016-275-03	1 year	2023-11-22	☐
ISN	Rohde & Schwarz	CAT5 8158	FWXGJC-2016-275-02	1 year	2023-12-03	□
ISN	Rohde & Schwarz	CAT3 8158	FWXGJC-2016-275-01	1 year	2023-11-22	□
Radiated Disturbance(3 Loop)						
EMI Receiver	Rohde & Schwarz	ESR3	FWXGJC-2016-181	1 year	2024-03-14	□
Triple Loop Antenna	Rohde & Schwarz	HXYZ 9170	FWXGJC-2016-195	1 year	2024-03-13	□
Disturbance power						
EMI Receiver	Rohde & Schwarz	ESR3	FWXGJC-2016-181	1 year	2024-03-14	□
Absorbing Clamp	Rohde & Schwarz	MDS-21	FWXGJC-2016-187	1 year	2024-03-23	□
Discontinuous disturbance						
Click analyzer	AFJ	DDA55	FWXGJC-2016-178	1 year	2023-10-09	□
L.I.S.N	AFJ	LT32C/10	FWXGJC-2016-179	1 year	2024-03-13	□
Electrostatic Discharge(ESD)						

ESD TESTER	3ctest	EDS 30T	FWXGDB-2016-129	1 year	2023-11-18	☑
Radiated Radio-Frequency Electromagnetic Field (RS)						
Signal Generator	Keysight	N5171B-506	FWXGJC-2016-269-05	1 year	2023-11-02	☑
double-Logarithmic antenna	Frankonia	AXL-80	FWXGJC-2016-269-03	1 year	2024-03-10	☑
Horn Antenna	Frankonia	HAX-6	FWXGJC-2016-269-04	1 year	2024-03-10	☑
Rf power probe	Agilent	U2001A	FGZZ-2020-004 FGZZ-2020-005	1 year	2024-03-05	☑
Amplifier	Frankonia	VLH-200B1	FWXGJC-2016-269-02	1 year	2023-11-24	☑
Power Amplifier	Frankonia	VLG-40/30G	FWXGJC-2016-269-01	1 year	2023-12-20	☑
Semi anechoic chamber	EMC	EMCCT-3	FWXGJC-2016-270	1 year	2025-06-07	☑
RF switch	Frankonia	RSU-4203	FWXGJC-2016-269-08	/	/	☑
Electrical Fast Transient/Burst Immunity Test(EFT)						
EFT Generator	3ctest	EFT 500T	FWXGDA-2016-130	1 year	2024-01-29	☑
Capacitive coupling clamp	3ctest	/	FWXGDA-2016-139	/	/	☐
Surge Immunity Test(Surge)						
Surge Generator	3ctest	CWS 600G	FWXGDA-2016-141	1 year	2024-03-05	☑
CDN	3ctest	SPN3832T	FWXGDA-2016-142	1 year	2024-03-05	☑
Surge Generator	3ctest	SG 5010H	FWXGJC-2016-281-01	1 year	2023-07-19	☐
CDN	3ctest	CDN40578A	FWXGJC-2016-281-03	1 year	2023-07-19	☐
CDN	SHANGHAI LIONCEL	CDN-508S	FWXGJC-2021-003	1 year	2024-08-09	□
Conducted Immunity Test(CS)						
Signal Generator	TESEQ	NSG 4070-35	FWXGJC-2016-188	1 year	2024-01-15	☑
Attenuator	TESEQ	ATN 6050	FWXGJC-2016-193	1 year	2023-12-15	☑
CDN	TESEQ	CDN M016	FWXGJC-2016-189	1 year	2023-11-20	☑
Decoupling pliers	TESEQ	KEMA 801A	FWXGJC-2016-191	1 year	2023-11-20	□
Current injection clamp	TESEQ	CIP 9136A	FWXGJC-2016-192	1 year	2023-11-17	□
CDN	3ctest	CDN-M5-32A	SHGDA-2020-015	1 year	2023-10-05	□
CDN	3ctest	CDN419M4N-32	SHGDA-2021-020	1 year	2023-12-23	□
CDN	SHANGHAI	CDN-T8	FGGDB-2021-004	1 year	2023-08-03	☐

	LIONCEL					
CDN	Frankonia	CDN-T2	SHGDA-2020-015	1 year	2023-09-27	□
CDN	SHANGHAI LIONCEL	CDN-S8	FGGDB-2021-005	1 year	2023-08-03	□
Power frequency magnetic field(PFMF)						
Power frequency magnetic field Generator	3ctest	MFS 400	FWXGJC-2016-280	1 year	2023-12-20	☑
Voltage Dips & Short Interruptions&H&F						
Harmonic analyzer	Ametek	100-CTS-230	FWXGJC-2016-176	1 year	2024-05-09	☑
Harmonic power supply	Ametek	5001ix-400-411 -413	FWXGJC-2016-177	1 year	2023-12-26	☑
Thermohygrometer						
30KVA power supply	apc	AFC-33030T	FWXGJC-2016-293	1 year	2023-12-20	☑
500V DC power supply	apc	ADC2K	FWXGJC-2016-295	1 year	2023-12-20	☐
Shielding room	Aimuke	/	FWXGJC-2016-273	1 year	2024-03-21	☑
Hygrothermograph	Mittel	HTC-1	FWXDA-2016-387	1 year	2023-11-21	☑
Hygrothermograph	Mittel	HTC-1	FWXDA-2016-386	1 year	2023-11-21	☑
Hygrothermograph	Mittel	HTC-1	FWXDA-2016-385	1 year	2024-03-21	☑
Aneroid Barometer	Shanghai Yipin	DYM3	FWXDA-2018-038	1 year	2023-12-01	☑

4. MEASUREMENT UNCERTAINTY

Where relevant, the following test uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k = 2.

AC Conducted Emission Measurement
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 2.05dB
LAN Port Conducted Emission Measurement
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 2.15dB
Radiated Emission Measurement(Below 1GHz)
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 3.06 dB
Radiated Emission Measurement(Above 1GHz)
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 4.13 dB

5. EMISSION TEST

5.1 CONDUCTED EMISSION MEASUREMENT

5.1.1 LIMITS

Limits – Class B		
Frequency (MHz)	**Limit dB (μV) (AC mains)**	
	Quasi-Peak	**Average**
0.15 to 0.50	66 - 56	56 - 46
0.50 to 5	56	46
5 to 30	60	50

NOTE:

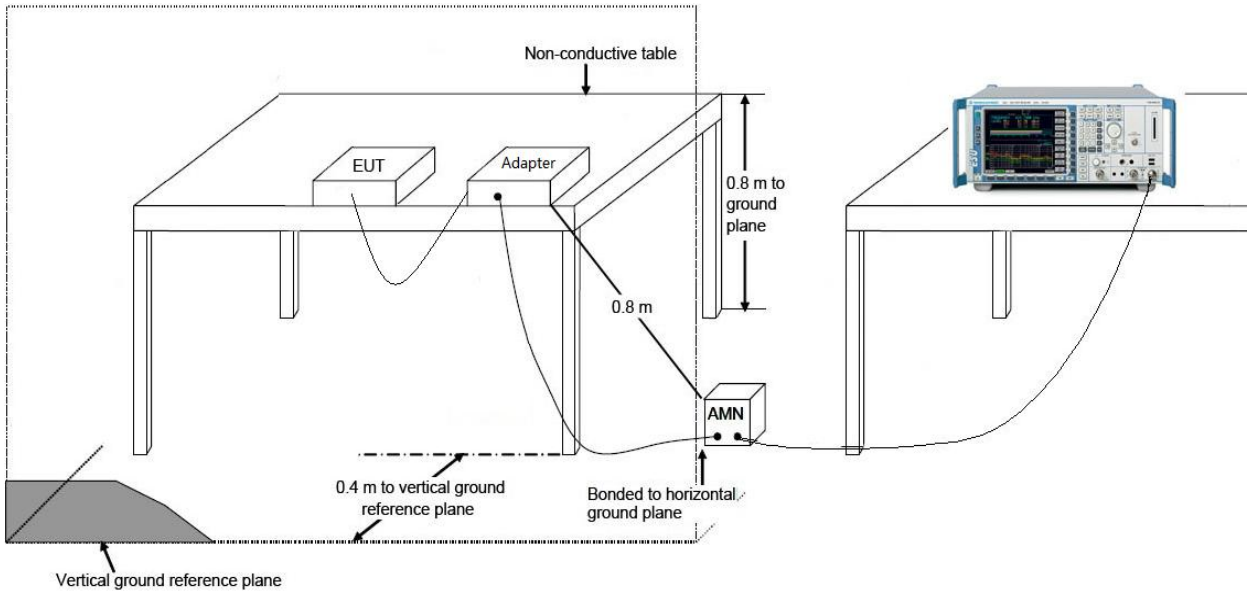
(1) The lower limit shall apply at the transition frequencies.

(2) The limit decreases in line with the logarithm of the frequency in the ranges 150 kHz to 0.5MHz.

5.1.2 TEST PROCEDURES

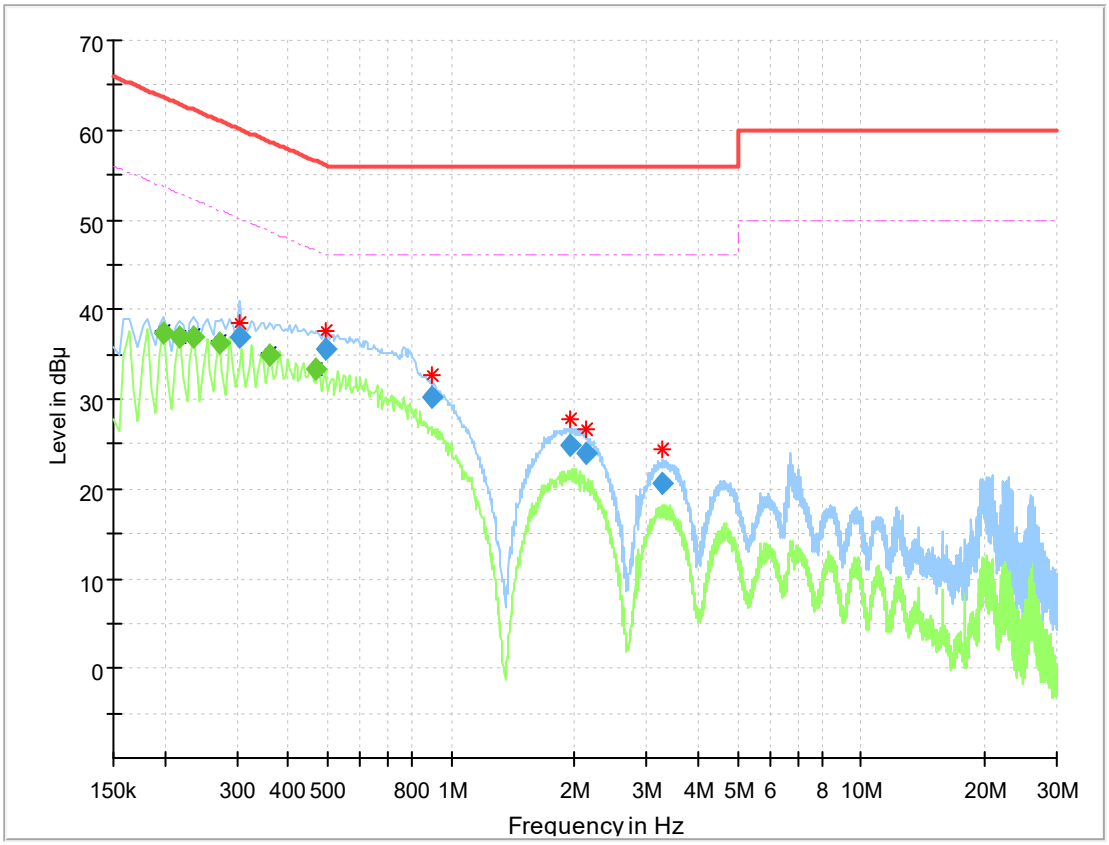
(1) The EUT was placed on a non-metallic table, 80cm above the ground plane.
(2) The EUT's power adapter was connected to the power mains through a line impedance stabilization network (L.I.S.N). which this provided a 50-ohm coupling impedance for the EUT (Please refer to the block diagram of the test setup and photographs). Both sides of power line were checked for maximum conducted disturbance. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to EN55032 on conducted disturbance emission test.
(3) The bandwidth of test receiver is set at 9 KHz.
(4) The frequency range from 150 KHz to 30MHz is checked.

5.1.3 TEST SETUP



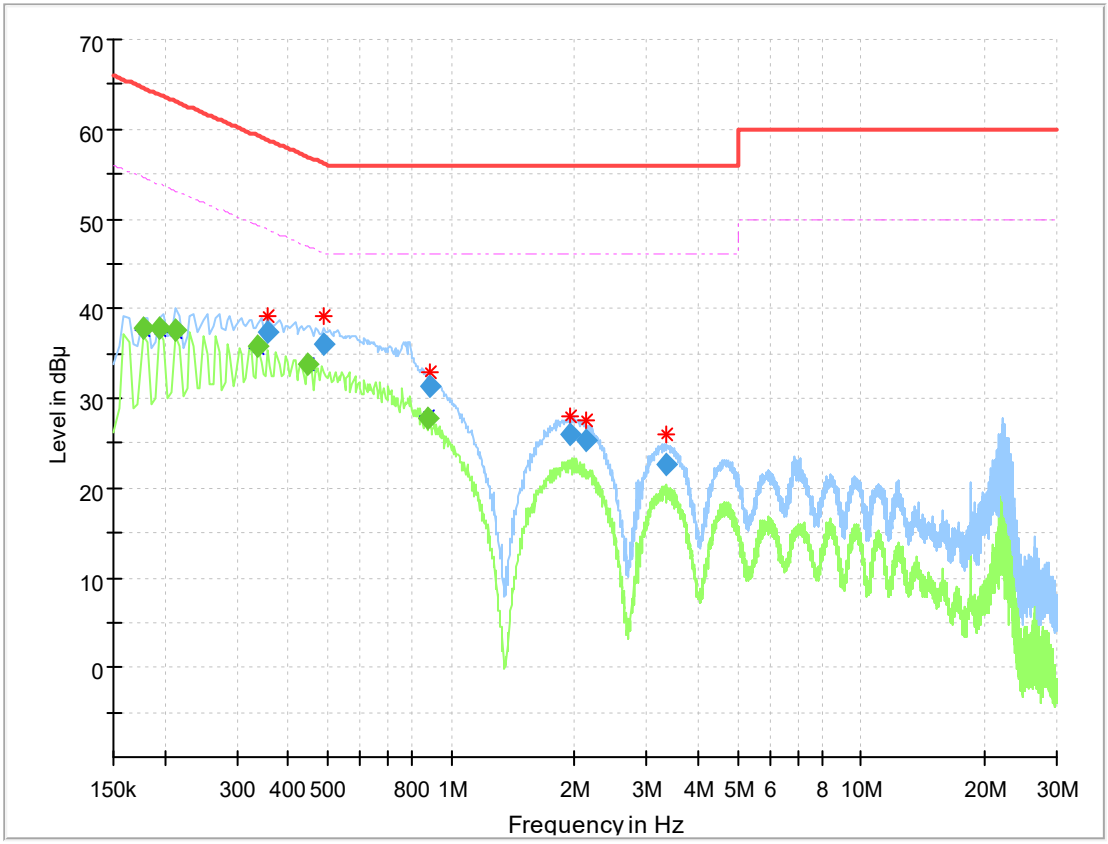
5.1.4 TEST RESULTS

Model:	DCM-K01	Phase:	L
Temp./Hum.(%RH):	22 ℃, 51 %	Powe supply:	AC 230V/50Hz
Test by:	Amos Xia	Date:	2023/05/15



Frequency (MHz)	QuasiPeak (dB µ V)	Average (dB µ V)	Limit (dB µ V)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.199500	---	37.33	53.63	16.31	100.0	9.000	L1	ON	9.6
0.217500	---	36.86	52.91	16.05	100.0	9.000	L1	ON	9.6
0.235500	---	36.84	52.25	15.42	100.0	9.000	L1	ON	9.6
0.271500	---	36.28	51.07	14.79	100.0	9.000	L1	ON	9.6
0.303000	36.90	---	60.16	23.27	100.0	9.000	L1	ON	9.6
0.361500	---	34.94	48.69	13.76	100.0	9.000	L1	ON	9.6
0.469500	---	33.42	46.52	13.10	100.0	9.000	L1	ON	9.6
0.496500	35.51	---	56.06	20.54	100.0	9.000	L1	ON	9.6
0.892500	30.32	---	56.00	25.68	100.0	9.000	L1	ON	9.6
1.945500	24.82	---	56.00	31.18	100.0	9.000	L1	ON	9.6
2.130000	24.06	---	56.00	31.94	100.0	9.000	L1	ON	9.6
3.286500	20.71	---	56.00	35.29	100.0	9.000	L1	ON	9.6

Model:	DCM-K01	Phase:	N
Temp./Hum.(%RH):	22 ℃，51 %	Powe supply:	AC 230V/50Hz
Test by:	Amos Xia	Date:	2023/05/15



Frequency (MHz)	QuasiPeak (dB µ V)	Average (dB µ V)	Limit (dB µ V)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.177000	---	37.72	54.63	16.90	100.0	9.000	N	ON	9.6
0.195000	--	37.78	53.82	16.04	100.0	9.000	N	ON	9.6
0.213000	---	37.58	53.09	15.51	100.0	9.000	N	ON	9.6
0.339000	---	35.77	49.23	13.46	100.0	9.000	N	ON	9.6
0.357000	37.45	---	58.80	21.35	100.0	9.000	N	ON	9.6
0.447000	---	33.90	46.93	13.03	100.0	9.000	N	ON	9.6
0.487500	36.06	---	56.21	20.15	100.0	9.000	N	ON	9.6
0.879000	---	27.76	46.00	18.24	100.0	9.000	N	ON	9.6
0.883500	31.28	---	56.00	24.72	100.0	9.000	N	ON	9.6
1.941000	26.02	---	56.00	29.98	100.0	9.000	N	ON	9.6
2.125500	25.40	---	56.00	30.60	100.0	9.000	N	ON	9.6
3.336000	22.72	---	56.00	33.28	100.0	9.000	N	ON	9.6

5.2 RADIATED EMISSION

5.2.1 LIMITS

Limits – Class B			
Frequency (MHz)	**Limit dB (μV/m) (3m)**		
	Detector		
	Average	**Quasi-Peak**	**Peak**
30 to 230	/	40	/
230 to 1000	/	47	/
1000 to 3000	50	/	70
3000 to 6000	54	/	74

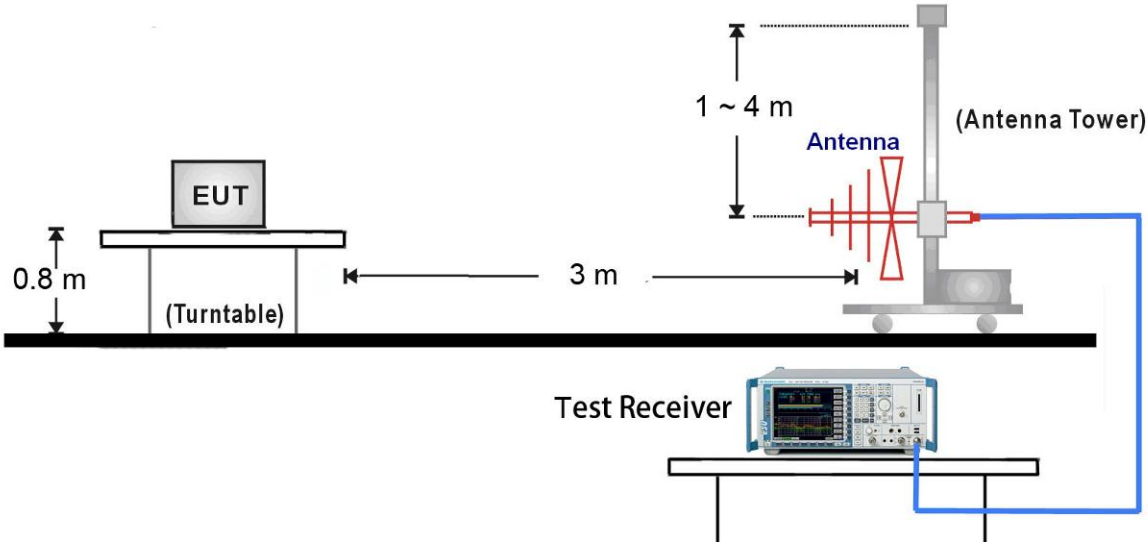
NOTE: The lower limit shall apply at the transition frequencies.

5.2.2 TEST PROCEDURE

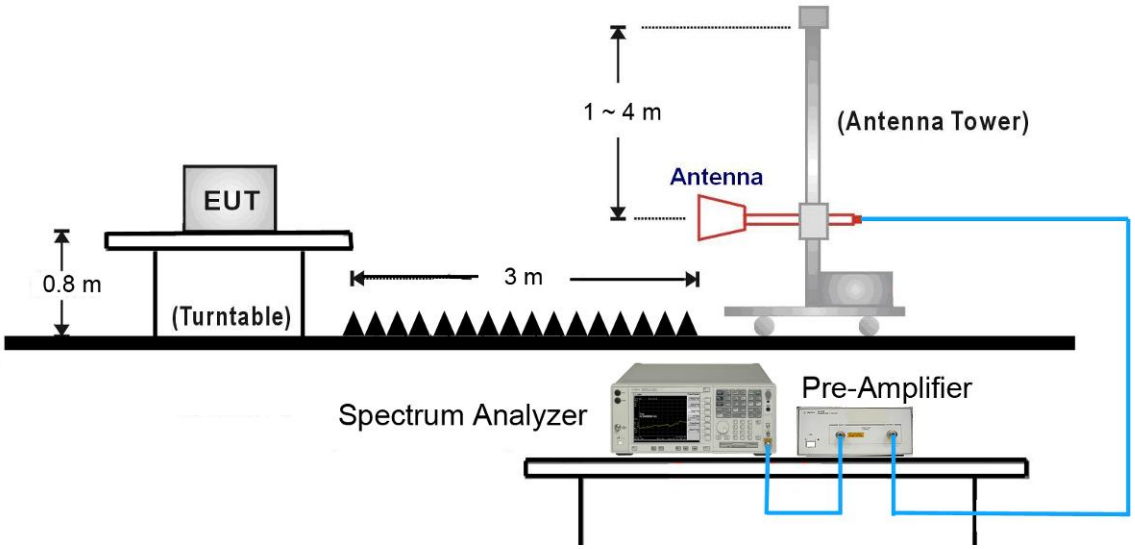
(1) The EUT was placed on a non-metallic table, 80 cm above the ground plane inside an semi-anechoic chamber.
(2) Test antenna was located 3m (see note) from the EUT on an adjustable mast. A pre-scan was first performed in order to find prominent radiated emissions. For final emissions measurements at each frequency of interest, the EUT were rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to EN55032 on radiated emission test.
(3) Spectrum frequency from 30MHz to 6GHz was investigated.
(4) For final emissions measurements at each frequency of interest, the EUT were rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to EN55032 on Radiated Emission test.
(5) For emissions from 30MHz to 1GHz, Quasi-Peak values were measured with EMI Receiver and the bandwidth of Receiver is 120 KHz.
(6) For emissions above 1GHz, both Peak and Average level were measured with Spectrum Analyzer, and the RBW is set at 1MHz VBW is set at 3MHz.

5.2.3 TEST SETUP

30MHz ~ 1GHz Test Setup:

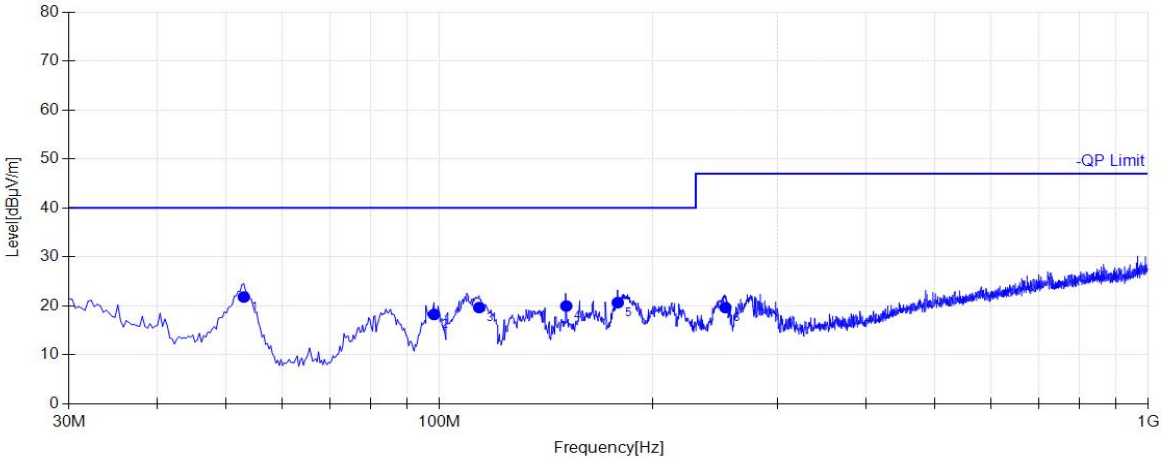


1GHz ~6GHz Test Setup:



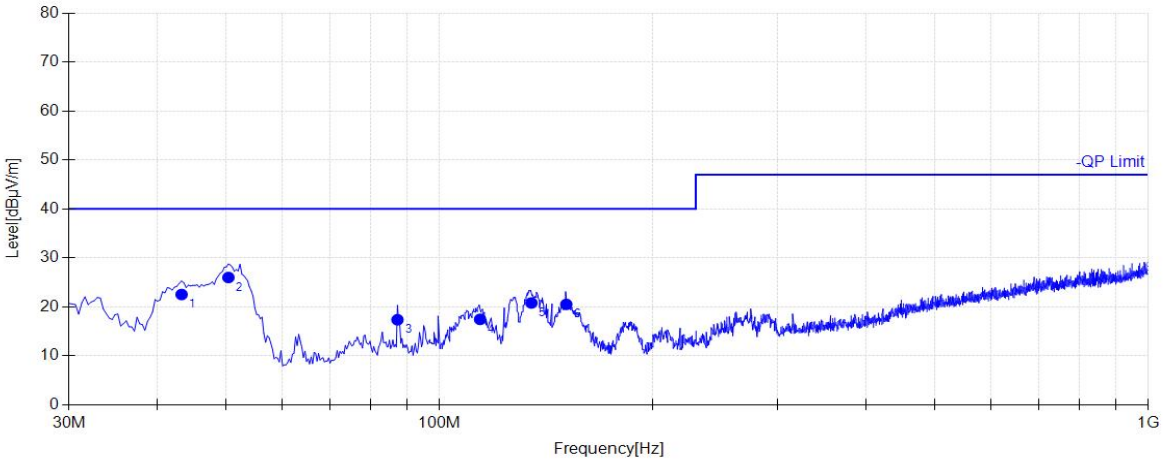
5.2.4 TEST RESULTS

Model:	DCM-K01	Polarity:	Horizontal
Temp./Hum.(%RH):	22 ℃，51 %	Powe supply:	AC 230V/50Hz
Test by:	Amos Xia	Date:	2023/05/15



Final Data List								
NO.	Freq. [MHz]	Factor [dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	52.9643	8.71	21.82	40.00	18.18	200	309	Horizontal
2	98.2461	11.03	18.26	40.00	21.74	200	85	Horizontal
3	113.7713	11.53	19.66	40.00	20.34	200	100	Horizontal
4	150.9670	10.78	19.97	40.00	20.03	200	219	Horizontal
5	178.4595	10.69	20.67	40.00	19.33	200	24	Horizontal
6	253.1744	11.72	19.67	47.00	27.33	100	239	Horizontal

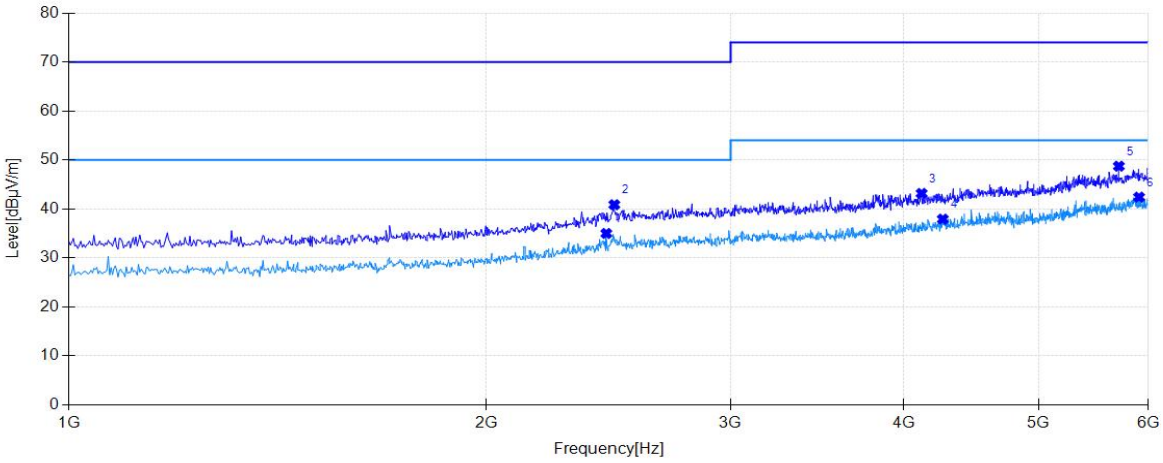
Model:	DCM-K01	Polarity:	Vertical
Temp./Hum.(%RH):	25 ℃，53 %	Powe supply:	AC 230V/50Hz
Test by:	Amos Xia	Date:	2023/05/15



Final Data List

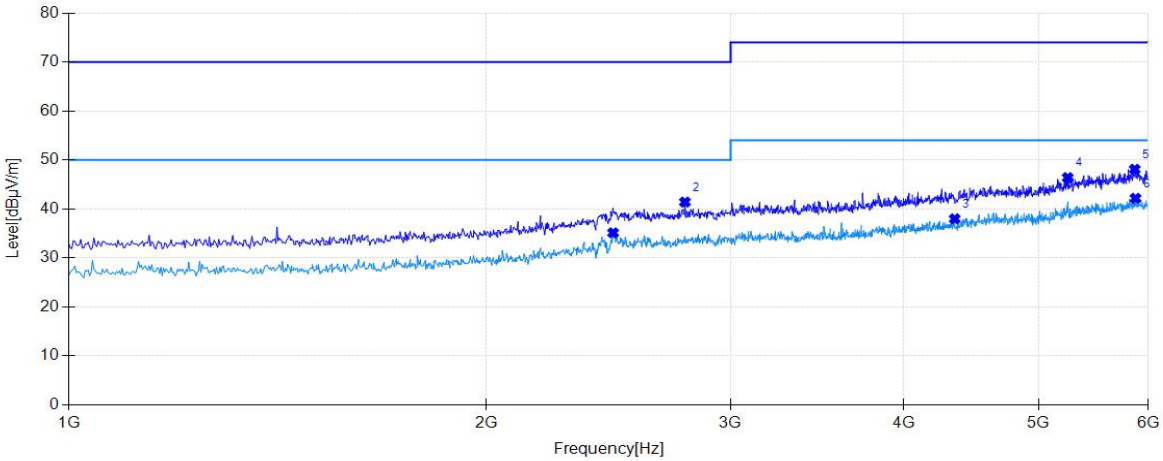
NO.	Freq. [MHz]	Factor [dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	43.2611	12.97	22.53	40.00	17.47	100	92	Vertical
2	50.3768	9.42	26.01	40.00	13.99	100	220	Vertical
3	87.2491	9.91	17.38	40.00	22.62	100	24	Vertical
4	114.0947	11.54	17.47	40.00	22.53	200	176	Vertical
5	134.7949	11.43	20.80	40.00	19.20	100	87	Vertical
6	150.9670	10.78	20.52	40.00	19.48	100	184	Vertical

Model:	DCM-K01	Polarity:	Horizontal
Temp./Hum.(%RH):	23 ℃，52 %	Powe supply:	AC 230V/50Hz
Test by:	Amos Xia	Date:	2023/05/15



Suspected Data List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2440.72	34.99	2.40	50.00	15.01	100	315	Horizontal
2	2473.23	40.86	2.81	70.00	29.14	100	184	Horizontal
3	4119.05	43.17	6.11	74.00	30.83	200	190	Horizontal
4	4266.63	37.91	6.76	54.00	16.09	200	285	Horizontal
5	5714.85	48.72	11.48	74.00	25.28	100	60	Horizontal
6	5909.95	42.40	12.42	54.00	11.60	200	356	Horizontal

Model:	DCM-K01	Polarity:	Vertical
Temp./Hum.(%RH):	23 ℃，52 %	Powe supply:	AC 230V/50Hz
Test by:	Amos Xia	Date:	2023/05/15



Suspected Data List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2468.23	35.12	2.75	50.00	14.88	100	80	Vertical
2	2780.89	41.40	3.02	70.00	28.60	100	0	Vertical
3	4351.67	37.98	6.96	54.00	16.02	100	255	Vertical
4	5249.62	46.39	9.72	74.00	27.61	100	270	Vertical
5	5867.43	48.09	12.18	74.00	25.91	200	357	Vertical
6	5874.93	42.17	12.25	54.00	11.83	200	266	Vertical

5.3 HARMONICS CURRENT MEASUREMENT

5.3.1 LIMITS

Limits for class A equipment		Limits for class D equipment		
Harmonics Order n	Max. permissible harmonics current A	Harmonics Order n	Max. permissible harmonics current per watt mA/W	Max. permissible harmonics current A
Odd harmonics		Odd Harmonics only		
3	2.30	3	3.4	2.30
5	1.14	5	1.9	1.14
7	0.77	7	1.0	0.77
9	0.40	9	0.5	0.40
11	0.33	11	0.35	0.33
13	0.21	13	0.30	0.21
15<=n<=39	0.15x15/n	15<=n<=39	3.85/n	0.15x15/n
Even harmonics				
2	1.08			
4	0.43			
6	0.30			
8<=n<=40	0.23x8/n			

NOTE:

1. Class A and class D are classified according to item 4.3.3.
2. According to section 7.1 of EN IEC 61000-3-2, for equipment with a rated power of 75 W or less, other than lighting equipment, limits are not specified in this document, it is not apply to this item.

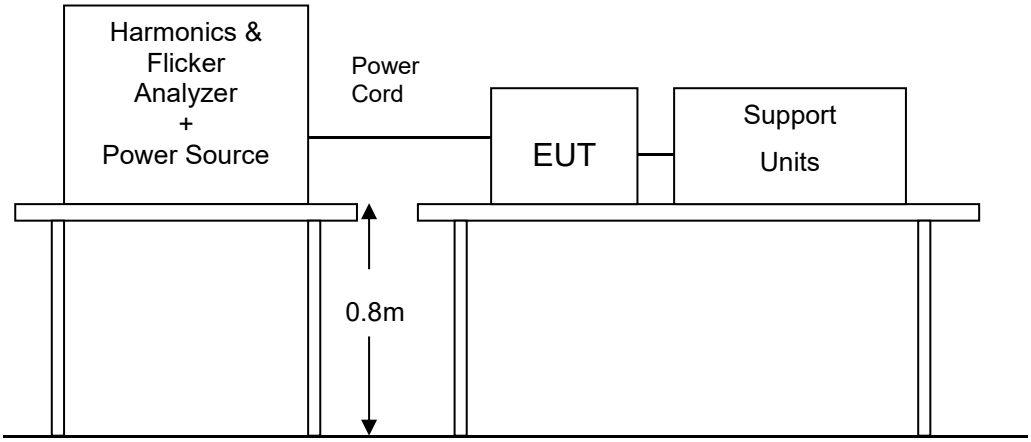
5.3.2 TEST PROCEDURE

The EUT was placed on the top of a wooden table 0.1 meters above the ground and operated to produce the maximum harmonic components under normal operating conditions for each successive harmonic component in turn.

The EUT is classified as follows:

Class A	Balanced three-phase equipment, Household appliances excluding equipment as Class D, Tools excluding portable tools, Dimmers for incandescent lamps, audio equipment, equipment not specified in one of the three other classes.
Class B	Portable tools; Arc welding equipment which is not professional equipment.
Class C	Lighting equipment
Class D	Equipment having a specified power less than or equal to 600 W of the following types: Personal computers and personal computer monitors and television receivers. The correspondent test program of test instrument to measure the current harmonics emanated from EUT is chosen. The measure time shall be not less than the time necessary for the EUT to be exercised.

5.3.3 TEST SETUP

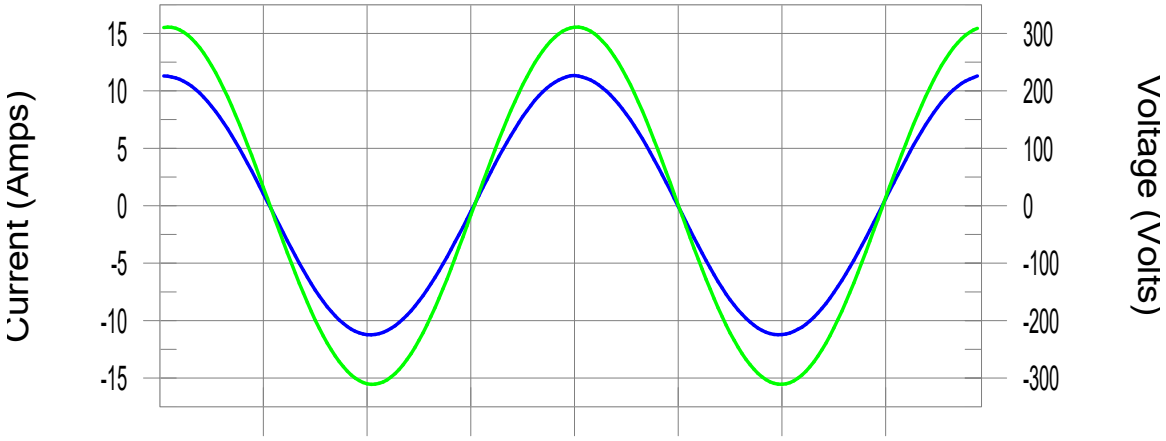

Harmonics &
Flicker
Analyzer
+
Power Source
Power
Cord
EUT
Support
Units
0.8m

5.3.4 TEST RESULTS

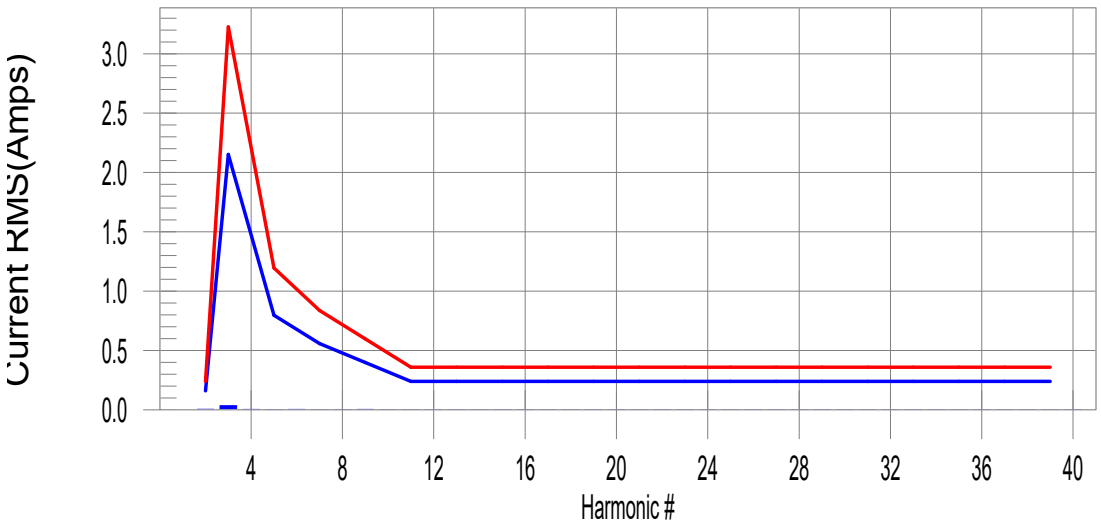
EUT: DCM-K01 **Tested by: Amos Xia**
Test category: Class-A (European limits) **Test Margin: 100**
Test date: 2023/5/15 **Start time: 21:09:43** **End time: 21:12:24**
Test duration (min): 2.5 **Data file name: H-000438.cts_data**

Test Result: Pass **Source qualification: Normal**

Current & voltage waveforms



Harmonics and Class A limit line **European Limits**



Test result: Pass **Worst harmonics H0-0.0% of 150% limit, H0-0% of 100% limit**

EUT: DCM-K01 **Tested by: Amos Xia**
Test category: Class-C (European limits) **Test Margin: 100**
Test date: 2023/5/15 **Start time: 11:28:35** **End time: 11:31:16**
Test duration (min): 2.5 **Data file name: H-000428.cts_data**
Comment: Comment
Customer: Customer information

Test Result: Pass **Source qualification: Distorted**
THC(A): 0.036 **I-THD(%): 0.5** **POHC(A): 0.002** **POHC Limit(A): 0.756**

Highest parameter values during test:

V_RMS (Volts):	**229.95**	**Frequency(Hz):**	**50.00**
I_Peak (Amps):	**11.342**	**I_RMS (Amps):**	**7.969**
I_Fund (Amps):	**7.969**	**Crest Factor:**	**1.425**
Power (Watts):	**1752.5**	**Power Factor:**	**1.000**

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.004	0.159	N/A	0.007	0.239	N/A	Pass
3	0.035	2.152	N/A	0.038	3.227	N/A	Pass
4	0.004	0.000	N/A	0.006	0.000	N/A	Pass
5	0.003	0.797	N/A	0.004	1.195	N/A	Pass
6	0.003	0.000	N/A	0.004	0.000	N/A	Pass
7	0.002	0.558	N/A	0.004	0.837	N/A	Pass
8	0.002	0.000	N/A	0.003	0.000	N/A	Pass
9	0.003	0.398	N/A	0.003	0.598	N/A	Pass
10	0.002	0.000	N/A	0.002	0.000	N/A	Pass
11	0.002	0.239	N/A	0.003	0.359	N/A	Pass
12	0.003	0.000	N/A	0.004	0.000	N/A	Pass
13	0.002	0.239	N/A	0.002	0.359	N/A	Pass
14	0.002	0.000	N/A	0.002	0.000	N/A	Pass
15	0.002	0.239	N/A	0.002	0.359	N/A	Pass
16	0.001	0.000	N/A	0.002	0.000	N/A	Pass
17	0.002	0.239	N/A	0.002	0.359	N/A	Pass
18	0.002	0.000	N/A	0.002	0.000	N/A	Pass
19	0.001	0.239	N/A	0.002	0.359	N/A	Pass
20	0.001	0.000	N/A	0.002	0.000	N/A	Pass
21	0.001	0.239	N/A	0.001	0.359	N/A	Pass
22	0.001	0.000	N/A	0.001	0.000	N/A	Pass
23	0.001	0.239	N/A	0.001	0.359	N/A	Pass
24	0.001	0.000	N/A	0.001	0.000	N/A	Pass
25	0.001	0.239	N/A	0.001	0.359	N/A	Pass
26	0.001	0.000	N/A	0.001	0.000	N/A	Pass
27	0.001	0.239	N/A	0.001	0.359	N/A	Pass
28	0.001	0.000	N/A	0.001	0.000	N/A	Pass
29	0.000	0.239	N/A	0.001	0.359	N/A	Pass
30	0.000	0.000	N/A	0.001	0.000	N/A	Pass
31	0.000	0.239	N/A	0.000	0.359	N/A	Pass
32	0.000	0.000	N/A	0.000	0.000	N/A	Pass
33	0.000	0.239	N/A	0.000	0.359	N/A	Pass
34	0.000	0.000	N/A	0.000	0.000	N/A	Pass
35	0.000	0.239	N/A	0.000	0.359	N/A	Pass
36	0.000	0.000	N/A	0.000	0.000	N/A	Pass
37	0.000	0.239	N/A	0.000	0.359	N/A	Pass
38	0.000	0.000	N/A	0.000	0.000	N/A	Pass
39	0.000	0.239	N/A	0.000	0.359	N/A	Pass
40	0.000	0.000	N/A	0.000	0.000	N/A	Pass

5.4 VOLTAGE FLUCTUATION AND FLICKS MEASUREMENT

5.4.1 LIMITS

Test standard: EN 61000-3-3

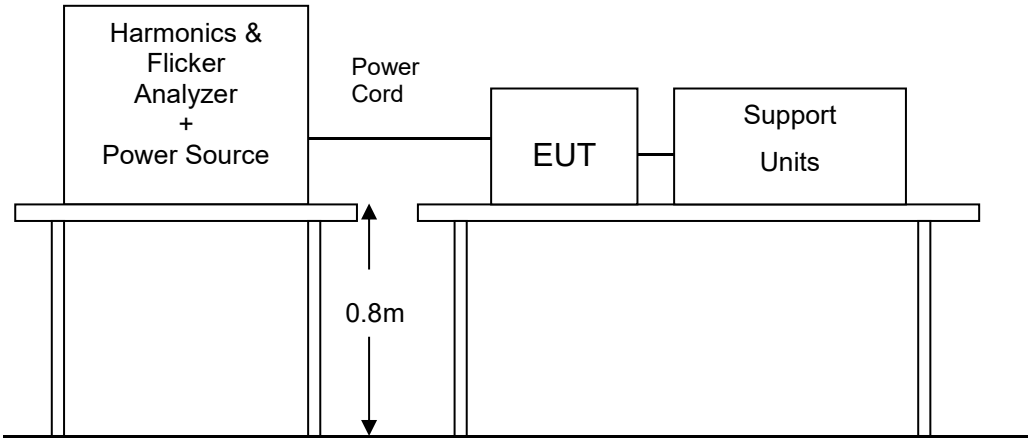
Test Item	Limit	Remark
P_{st}	1.0	P_{st} means short-term flicker indicator.
P_{lt}	0.65	P_{lt} means long-term flicker indicator.
T_{dt} (ms)	500	T_{dt} means maximum time that dt exceeds 3 %.
d_{max} (%)	4%,6%,7%	d_{max} means maximum relative voltage change.
dc (%)	3.3%	dc means relative steady-state voltage change

5.4.2 TEST PROCEDURE

The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the most unfavorable sequence of voltage changes under normal operating conditions.

During the flick measurement, the measure time shall include that part of whole operation cycle in which the EUT produce the most unfavorable sequence of voltage changes. The observation period for short-term flicker indicator is 10 minutes and the observation period for long-term flicker indicator is 2 hours.

5.4.3 TEST SETUP



5.4.4 TEST RESULTS

EUT: DCM-K01 **Tested by: Amos Xia**
Test category: All parameters (European limits) **Test Margin: 100**
Test date: 2023/5/15 **Start time: 21:15:09** **End time: 21:25:36**
Test duration (min): 10 **Data file name: F-000439.cts_data**
Comment: Comment
Customer: Customer information

Test Result: Pass **Status: Test Completed**

Pst_i and limit line **European Limits**

Plt and limit line

Parameter values recorded during the test:

Vrms at the end of test (Volt):	**226.72**			
Highest dt (%):		**Test limit (%):**		
T-max (mS):	**0**	**Test limit (mS):**	**500.0**	**Pass**
Highest dc (%):	**0.00**	**Test limit (%):**	**3.30**	**Pass**
Highest dmax (%):	**0.00**	**Test limit (%):**	**4.00**	**Pass**
Highest Pst (10 min. period):	**0.229**	**Test limit:**	**1.000**	**Pass**
Highest Plt (2 hr. period):	**0.100**	**Test limit:**	**0.650**	**Pass**

6. IMMUNITY TEST

6.1 ELECTROSTATIC DISCHARGE

6.1.1 TEST SPECIFICATION

Basic Standard	EN 61000-4-2
Discharge Voltage	Contact Discharge: ±2kV; ±4kV; Air Discharge: ±2kV; ±4kV; ±8kV
Polarity	Positive & Negative
Number of Discharge	20 times at each test point
Discharge Mode	Single Discharge 1 second

6.1.2 TEST PROCEDURE

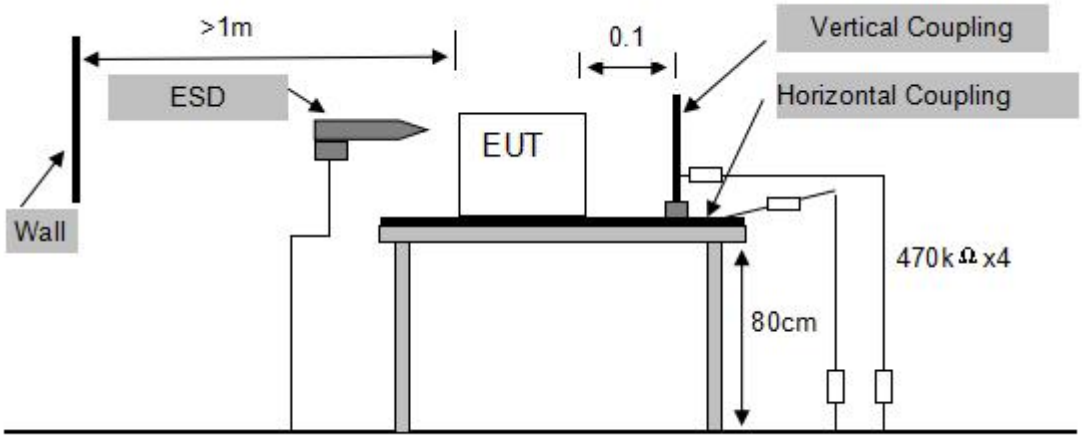
Air Discharge:
The test was applied on non-conductive surfaces of EUT. The round discharge tip of the discharge electrode was approached as fast as possible to touch the EUT. After each discharge, the discharge electrode was removed from the EUT. The generator was re-triggered for a new single discharge and repeated 20 times for each pre-selected test point. This procedure was repeated until all the air discharge completed.

Contact Discharge:
All the procedure was same as air discharge. Except that the generator was re-triggered for a new single discharge and repeated 20 times for each pre-selected test point. The tip of the discharge electrode was touching the EUT before the discharge switch was operated.

Indirect discharge for horizontal coupling plane:
At least 20 single discharges were applied to the horizontal coupling plane, at points on each side of the EUT. The discharge electrode positions vertically at a distance of 0.1m from the EUT and with the discharge electrode touching the coupling plane.

Indirect discharge for vertical coupling plane:
At least 20 single discharges were applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, was placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges were applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

6.1.3 TEST SETUP



NOTE:

TABLE-TOP EQUIPMENT

The configuration consisted of a wooden table 0.8 meters high standing on the Ground Reference Plane. The GRP consisted of a sheet of aluminum at least 0.25mm thick, and 2.5 meters square connected to the protective grounding system. A Horizontal Coupling Plane (1.6m * 0.8m) was placed on the ground and attached to the GRP by means of a cable with 940kΩ total impedance. The equipment under test, was installed in a representative system as described in section 7 of EN 61000-4-2, and its cables were placed on the HCP and isolated by an insulating support of 0.5mm thickness. A distance of 1-meter minimum was provided between the EUT and the walls of the laboratory and any other metallic structure.

FLOOR-STANDING EQUIPMENT

The equipment under test was installed in a representative system as described in section 7 of EN 61000-4-2, and its cables were isolated from the Ground Reference Plane by an insulating support of 0.1-meter thickness. The GRP consisted of a sheet of aluminum that is at least 0.25mm thick, and 2.5 meters square connected to the protective grounding system and extended at least 0.5 meters from the EUT on all sides.

6.1.4 TEST RESULTS

EUT Name:	Dual Relay Module T2	Model:	DCM-K01
Test Mode:	Mode 1	Environmental Conditions:	22.0℃51%RH101kPa
Test Date:	2023/5/15	Tested By:	Amos Xia

Discharge point	Discharge voltage	C-Contact A-Air	Required Performance	Actual performance	Result
Gap	±2, ±4, ±8kV	Air	Criterion B	Criterion A[a)]	PASS
Vertical coupling plane	±2, ±4kV	Contact	Criterion B	Criterion A[a)]	PASS
Horizontal coupling plane	±2, ±4kV	Contact	Criterion B	Criterion A[a)]	PASS
NOTE: [a)]There was no change compared with initial operation during the test.					

6.2 RADIATED RADIO-FREQUENCY ELECTROMAGNETIC FIELD

6.2.1 TEST SPECIFICATION

For EN 55035

Basic Standard	EN 61000-4-3
Frequency Range	80MHz ~1000MHz, 1800MHz,2600MHz, 3500MHz, 5000MHz
Field Strength	3V/m
Modulation	1kHz Sine Wave, 80%, AM Modulation
Frequency Step	1 % of preceding frequency value
Polarity of Antenna	Horizontal and Vertical
Test Distance	3 m
Antenna Height	1.55m

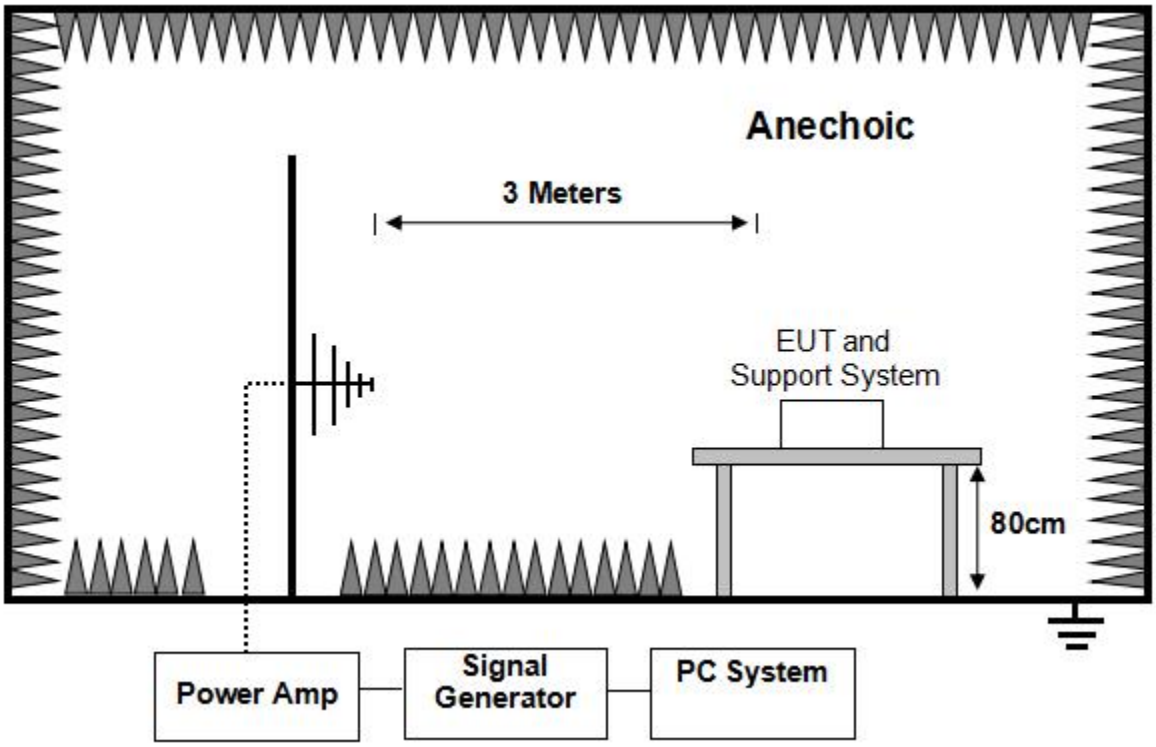
For EN 301489-1&-17

Basic Standard	EN 61000-4-3
Frequency Range	80MHz ~6000MHz
Field Strength	3V/m
Modulation	1kHz Sine Wave, 80%, AM Modulation
Frequency Step	1 % of preceding frequency value
Polarity of Antenna	Horizontal and Vertical
Test Distance	3 m
Antenna Height	1.55m
RF Exclusion band	2397.5MHz~2486MHz

6.2.2 TEST PROCEDURE

1) The testing was performed in a fully anechoic chamber. The transmit antenna was located at a distance of 3 meters from the EUT.
2) The frequency range is swept from 80MHz to 6000MHz with the signal 80% amplitude modulated with a 1kHz sine-wave. the step size was 1% of preceding frequency value.
3) The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.
4) The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.

6.2.3 TEST SETUP



6.2.4 TEST RESULTS

EUT Name:	Dual Relay Module T2	Model:	DCM-K01
Test Mode:	Mode 1	Environmental Conditions:	22.0℃51%RH101kPa
Test Date:	2023/5/15	Tested By:	Amos Xia

Frequency (MHz)	Field Strength (V/m)	Polarity	Azimuth	Required Performance	Actual performance	Result
80 MHz ~1000 MHz 1800MHz,2600MHz 3500MHz, 5000MHz	3V/m	V&H	Front	Criterion A	Criterion A a)	PASS
			Rear	Criterion A	Criterion A a)	PASS
			Left	Criterion A	Criterion A a)	PASS
			Right	Criterion A	Criterion A a)	PASS
NOTE: a) There was no change compared with initial operation during the test.						

Frequency (MHz)	Field Strength (V/m)	Polarity	Azimuth	Required Performance	Actual performance	Result
80 MHz ~6000 MHz	3V/m	V&H	Front	Criterion A	Criterion A a)	PASS
			Rear	Criterion A	Criterion A a)	PASS
			Left	Criterion A	Criterion A a)	PASS
			Right	Criterion A	Criterion A a)	PASS
NOTE: a) There was no change compared with initial operation during the test.						

6.3 ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST

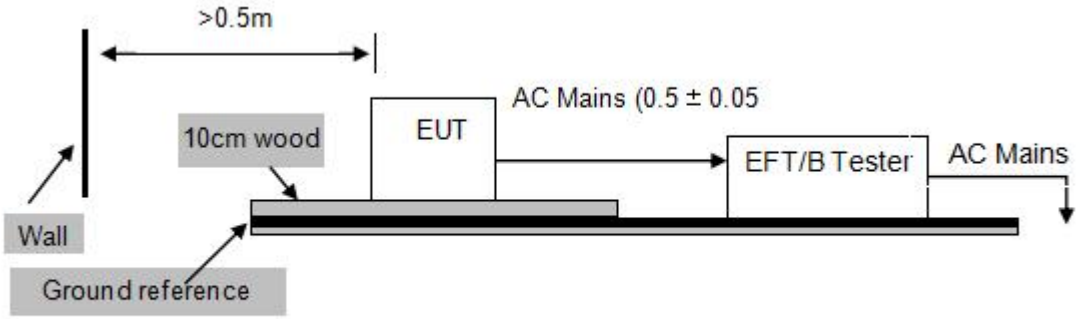
6.3.1 TEST SPECIFICATION

Basic Standard	EN 61000-4-4
Test Voltage	AC mains: ±1Kv; Signal Port:±0.5Kv
Polarity	Positive and Negative
Impulse Frequency	5 kHz
Impulse Wave-shape	5 ns/50ns for voltage
Burst Duration	15 ms
Burst Period	300 ms
Test Duration	2 minute

6.3.2 TEST PROCEDURE

The EUT and its simulators were placed on the ground reference plane and were insulated from it by a wood support 0.1m + 0.01m thick. The ground reference plane was 1m*1m metallic sheet with 0.65mm minimum thickness. This reference ground plane was project beyond the EUT by at least 0.1m on all sides and the minimum distance between EUT and all other conductive structure, except the ground plane was more than 0.5m. All cables to the EUT was placed on the wood support, cables not subject to EFT/B was routed as far as possible from the cable under test to minimize the coupling between the cables.
For input and AC power ports:
The EUT was connected to the power mains by using a coupling device that couples the EFT interference signal to AC power lines. Both positive transients and negative transients of test voltage were applied during compliance test and the duration of the test can't less than 1min.

6.3.3 TEST SETUP



6.3.4 TEST RESULTS

EUT Name:	Dual Relay Module T2	Model:	DCM-K01
Test Mode:	Mode 1	Environmental Conditions:	22.0℃51%RH101kPa
Test Date:	2023/5/15	Tested By:	Amos Xia

Inject Line	Polarity	Inject method	Repetition frequency	Required Performance	Actual performance	Result
L	±1Kv	Direct	5kHz	Criterion B	Criterion A [a)]	PASS
N	±1Kv	Direct	5kHz	Criterion B	Criterion A [a)]	PASS
L-N	±1Kv	Direct	5kHz	Criterion B	Criterion A [a)]	PASS
NOTE: [a)] There was no change compared with initial operation during the test.						

6.4 SURGE IMMUNITY TEST

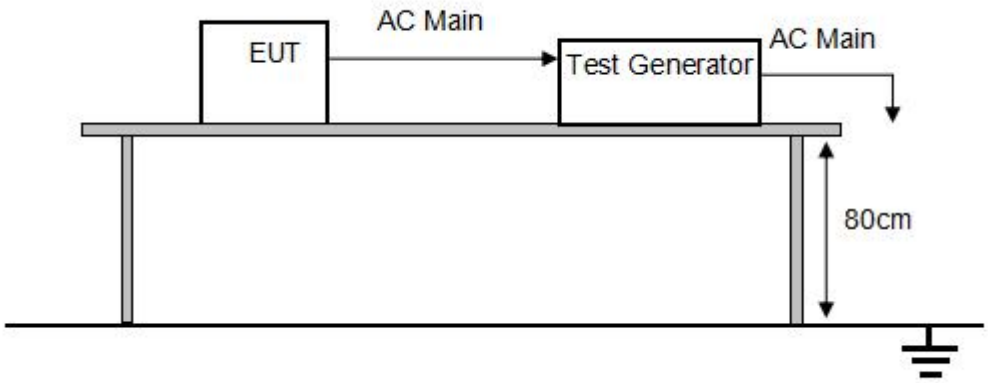
6.4.1 TEST SPECIFICATION

Basic Standard	EN 61000-4-5
Wave-Shape	Combination Wave 1.2/50 μs Open Circuit Voltage 8/20 μs Short Circuit Current;
Test Voltage	AC mains: L-N: ±1kV Line to Ground: ±2kV
Generator Source Impedance	Line to line 2ohm Line to PE 12ohm
Polarity	Positive and Negative
Phase Angle	0°, 90°, 180°, 270°
Pulse Repetition Rate	1 minute

6.4.2 TEST PROCEDURE

1) For EUT power supply:
2) The surge is applied to the EUT power supply terminals via the capacitive coupling network. Decoupling networks are required in order to avoid possible adverse effects on equipment not under test that may be powered by the same lines, and to provide sufficient decoupling impedance to the surge wave. The power cord between the EUT and the coupling/decoupling networks was shorter than 2 meters in length.
3) For test applied to unshielded un-symmetrically operated interconnection lines of EUT:
4) The surge was applied to the lines via the capacitive coupling. The coupling / decoupling networks didn't influence the specified functional conditions of the EUT. The interconnection line between the EUT and the coupling/decoupling networks was shorter than 2 meters in length.
5) For test applied to unshielded symmetrically operated interconnection / telecommunication lines of EUT:
6) The surge was applied to the lines via gas arrestors coupling. Test levels below the ignition point of the coupling arrestor were not specified.

6.4.3 TEST SETUP



6.4.4 TEST RESULTS

EUT Name:	Dual Relay Module T2	Model:	DCM-K01
Test Mode:	Mode 1	Environmental Conditions:	22.0℃51%RH101kPa
Test Date:	2023/5/15	Tested By:	Amos Xia

Test Point	Polarity	Pulse Voltage	Required Performance	Actual performance	Result
L-N	±	1KV	Criterion B	Criterion A [a)]	PASS
NOTE: [a)] There was no change compared with initial operation during the test.					

6.5 INJECTED CURRENTS SUSCEPTIBILITY TEST

6.5.1 TEST SPECIFICATION

For EN 55035

Basic Standard	EN 61000-4-6
Frequency Range	0.15 MHz～10 MHz, 10 MHz～30 MHz, 30 MHz～80 MHz
Field Strength	3V,3~1V,1V
Modulation	1kHz, 80% AM
Frequency Step	1%
Dwell Time	1s

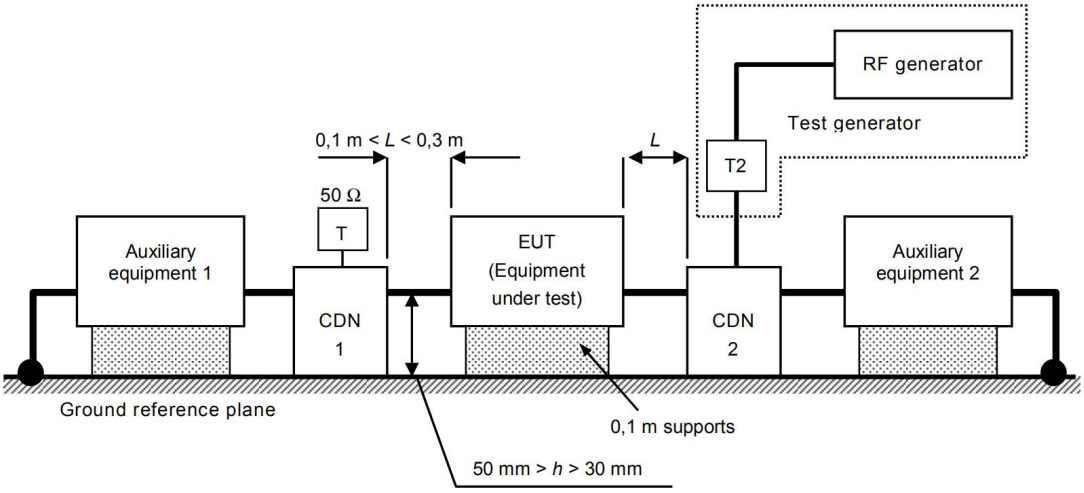
For EN 301489-1&-17

Basic Standard	EN 61000-4-6
Frequency Range	0.15 MHz～80 MHz
Field Strength	3V
Modulation	1kHz, 80% AM
Frequency Step	1%
Dwell Time	1s

6.5.2 TEST PROCEDURE

1) Set up the EUT, CDN and test generators as shown on Section 6.5.3
2) Let the EUT work in test mode and measure it.
3) The EUT are placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3m from EUT. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50 mm (where possible).
4) The disturbance signal described below is injected to EUT through CDN.
5) The EUT operates within its operational mode(s) under intended climatic conditions after power on.
6) The frequency range is swept from 150 kHz to 80MHz using above signal level, and with the disturbance signal 80% amplitude modulated with a 1 kHz sine wave.
7) Where the frequency is swept incrementally, the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value.
8) Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.

6.5.3 TEST SETUP



6.5.4 TEST RESULTS

EUT Name:	Dual Relay Module T2	Model:	DCM-K01
Test Mode:	Mode 1	Environmental Conditions:	22.0℃51%RH101kPa
Test Date:	2023/5/15	Tested By:	Amos Xia

Frequency Band (MHz)	Field Strength (V.rms)	Cable	Injection Method	Required Performance	Actual performance	Result (P/F)
0.15-10	3	AC port	CDN	Criterion A	Criterion A [a)]	PASS
10-30	3~1	AC port	CDN	Criterion A	Criterion A [a)]	PASS
30-80	1	AC port	CDN	Criterion A	Criterion A [a)]	PASS
NOTE: [a)] There was no change compared with initial operation during the test.						

Frequency Band (MHz)	Field Strength (V.rms)	Cable	Injection Method	Required Performance	Actual performance	Result (P/F)
0.15-80	3	AC port	CDN	Criterion A	Criterion A [a)]	PASS
NOTE: [a)] There was no change compared with initial operation during the test.						

6.6 POWER FREQUENCY MAGNETIC FIELD

6.6.1 TEST SPECIFICATION

Basic Standard	EN 61000-4-8
Test Level:	3A/m
Test Frequency:	50Hz
During Time:	1 minutes

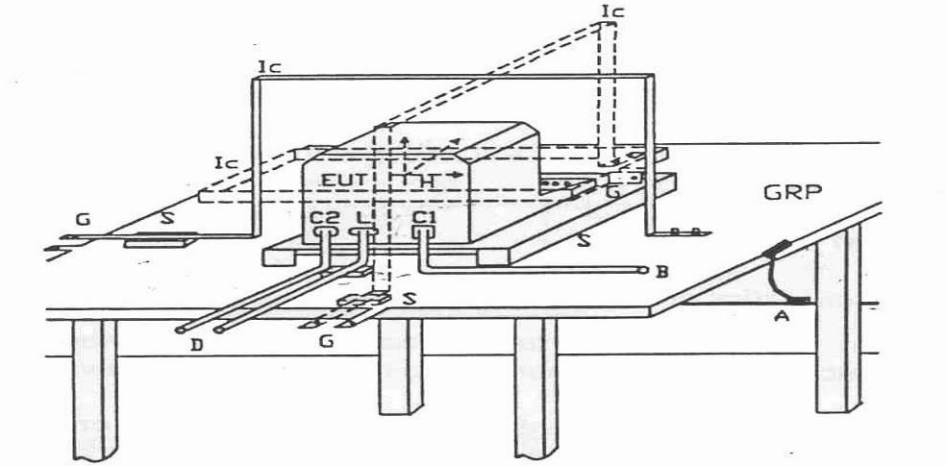
6.6.2 TEST PROCEDURE

a) The EUT and test generator were setup as shown on Section 6.6.3

b) Set the required test level and test during time, let the EUT work in test mode and measure it.

c) Record any degradation of performance.

6.6.3 TEST SETUP



6.6.4 TEST RESULTS

EUT Name:	Dual Relay Module T2	Model:	DCM-K01
Test Mode:	Mode 1	Environmental Conditions:	22.0℃51%RH101kPa
Test Date:	2023/5/15	Tested By:	Amos Xia

Inductive Coil Position	Test Level	Required Performance	Actual performance	Result (P/F)
X	3A/m	Criterion A	Criterion A a)	PASS
Y	3A/m	Criterion A	Criterion A a)	PASS
Z	3A/m	Criterion A	Criterion A a)	PASS
NOTE: a) There was no change compared with initial operation during the test.				

6.7 VOLTAGE DIP & VOLTAGE INTERRUPTIONS

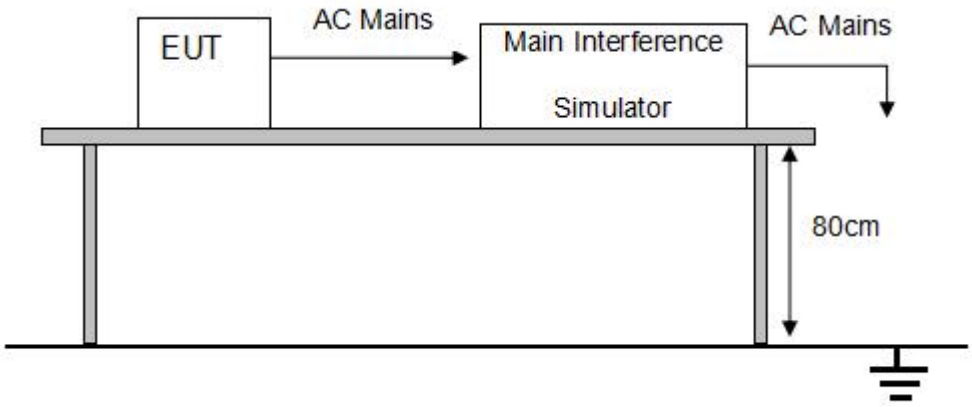
6.7.1 TEST SPECIFICATION

Basic Standard	EN 61000-4-11
Test duration time	Voltage dips: 30% during 25 and 30 periods, Meets the requirements of Performance Criterion C 100% during 0.5 and 1 periods, Meets the requirements of Performance Criterion B Voltage interruption: 100% during 250 and 300 cycles, Meets the requirements of Performance Criterion C
Interval between event	10s for each dips at each test angle
Phase Angle	0°

6.7.2 TEST PROCEDURE

1) The EUT and test generator were setup as shown on Section 6.7.3
2) The interruptions is introduced at selected phase angles with specified duration.
3) Record any degradation of performance.

6.7.3 TEST SETUP



6.7.4 TEST RESULTS

EUT Name:	Dual Relay Module T2	Model:	DCM-K01
Test Mode:	Mode 1	Environmental Conditions:	22.0℃51%RH101kPa
Test Date:	2023/5/15	Tested By:	Amos Xia

Test level %U_T	Voltage Dip & Interruptions %U_T	Duration (Period)	Required Performance	Actual performance	Result
70%	30%	25T for 50Hz	Criterion C	Criterion A[a)]	PASS
0%	100%	0.5T	Criterion B	Criterion A[a)]	PASS
0%	100%	250T for 50Hz	Criterion C	Criterion B[b)]	PASS

NOTE: [a)] There was no change compared with initial operation during the test.
[b)] During the test, the EUT will stop working. After the test, the EUT can return to normal working state.

APPENDIX A. PHOTOGRAPHS OF EUT

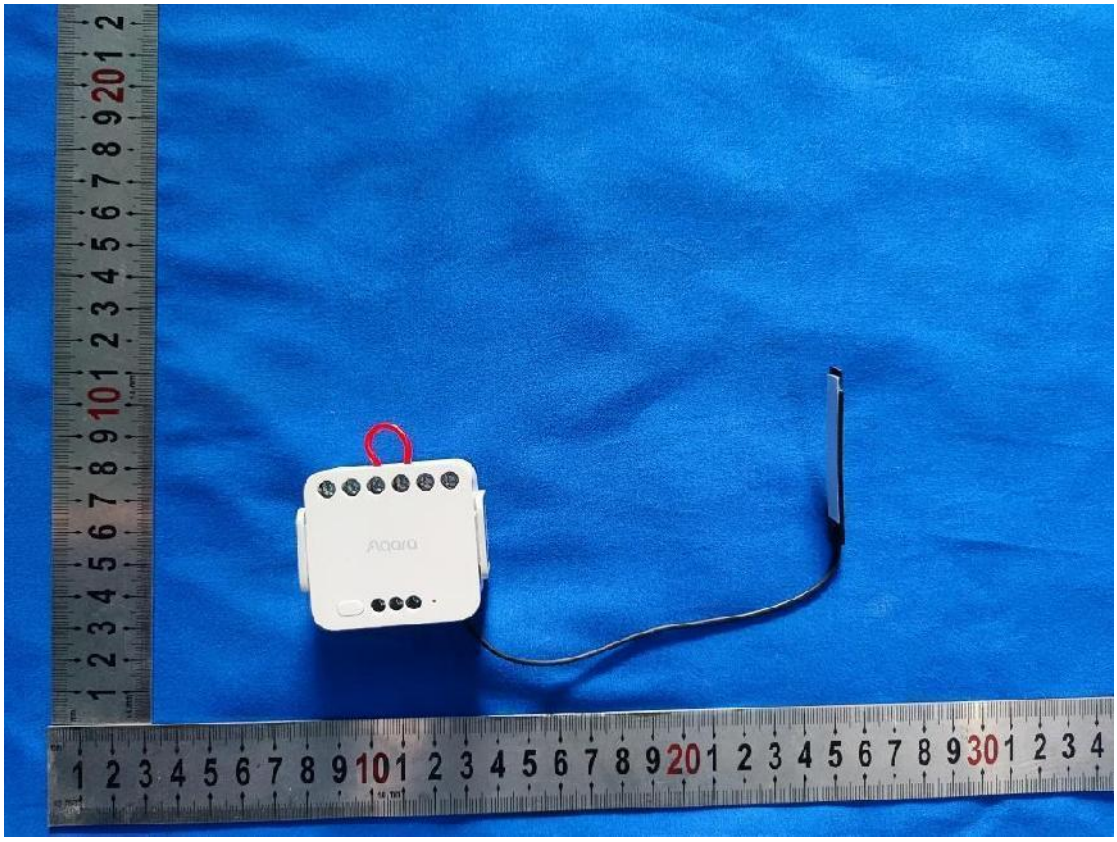


Photo 1: General view

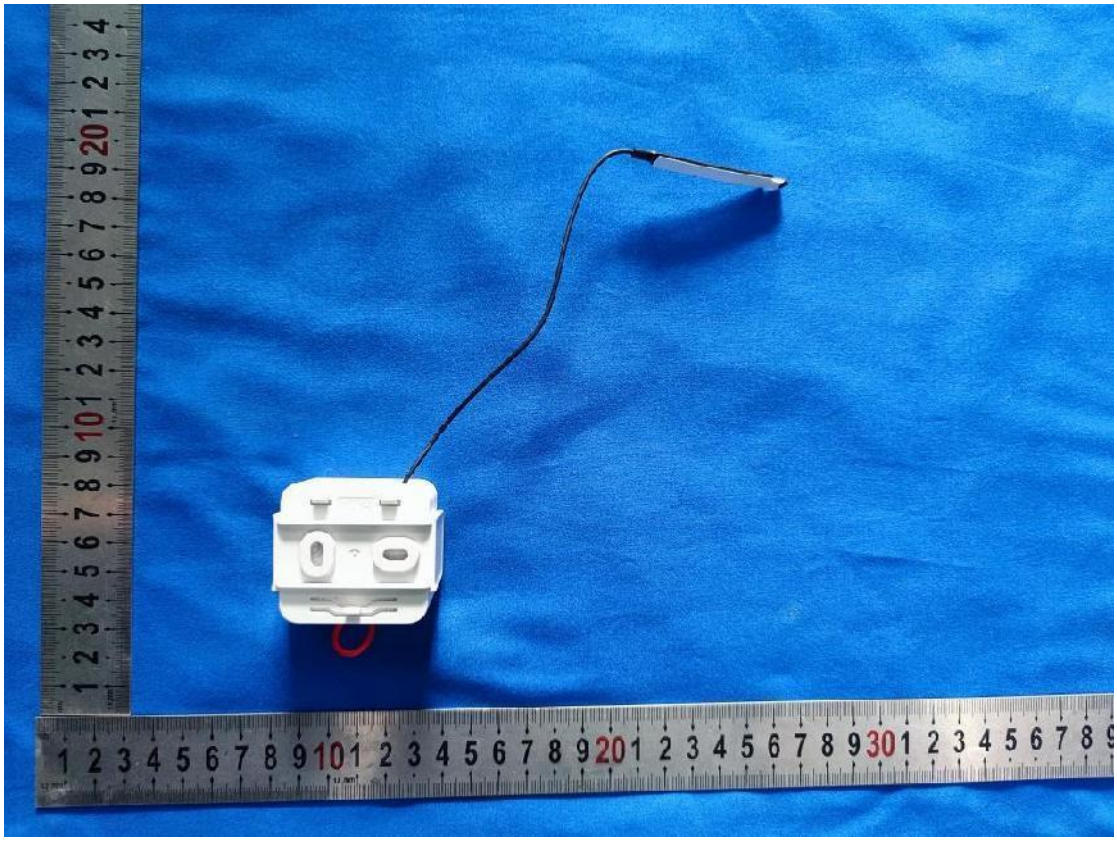


Photo 2: General view

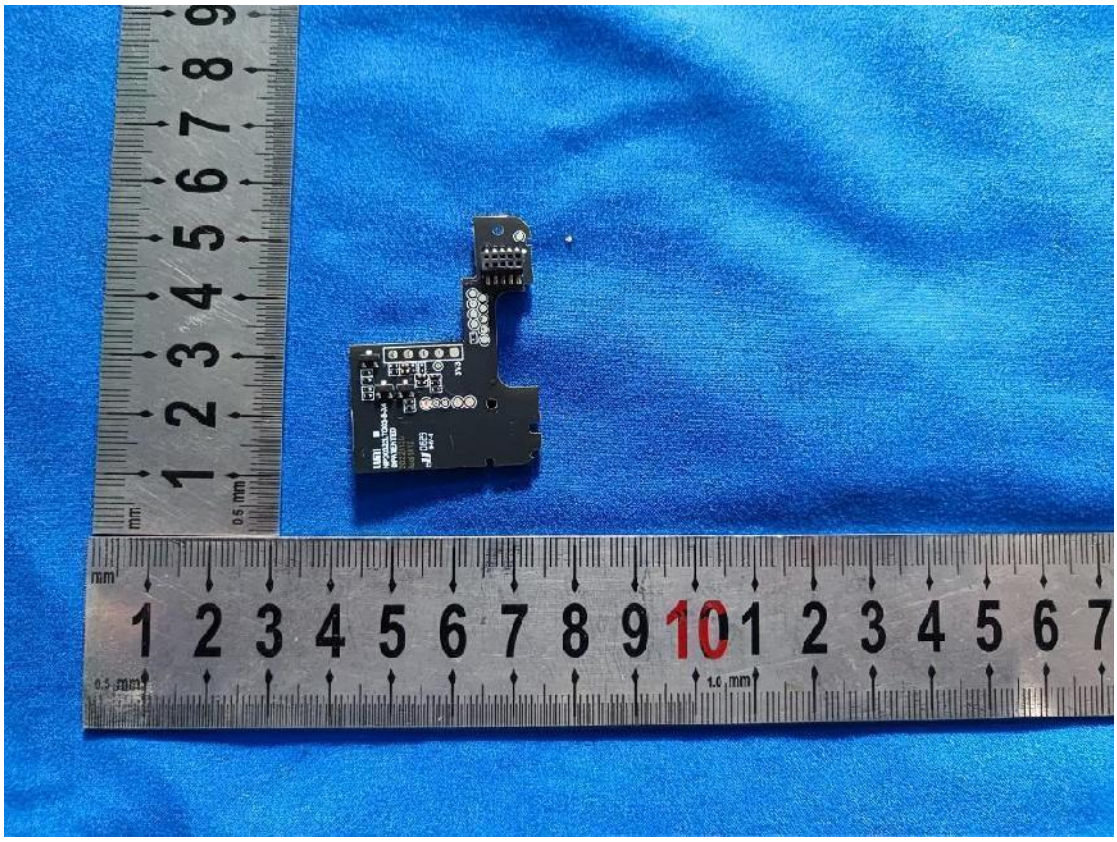


Photo 3: PCB view

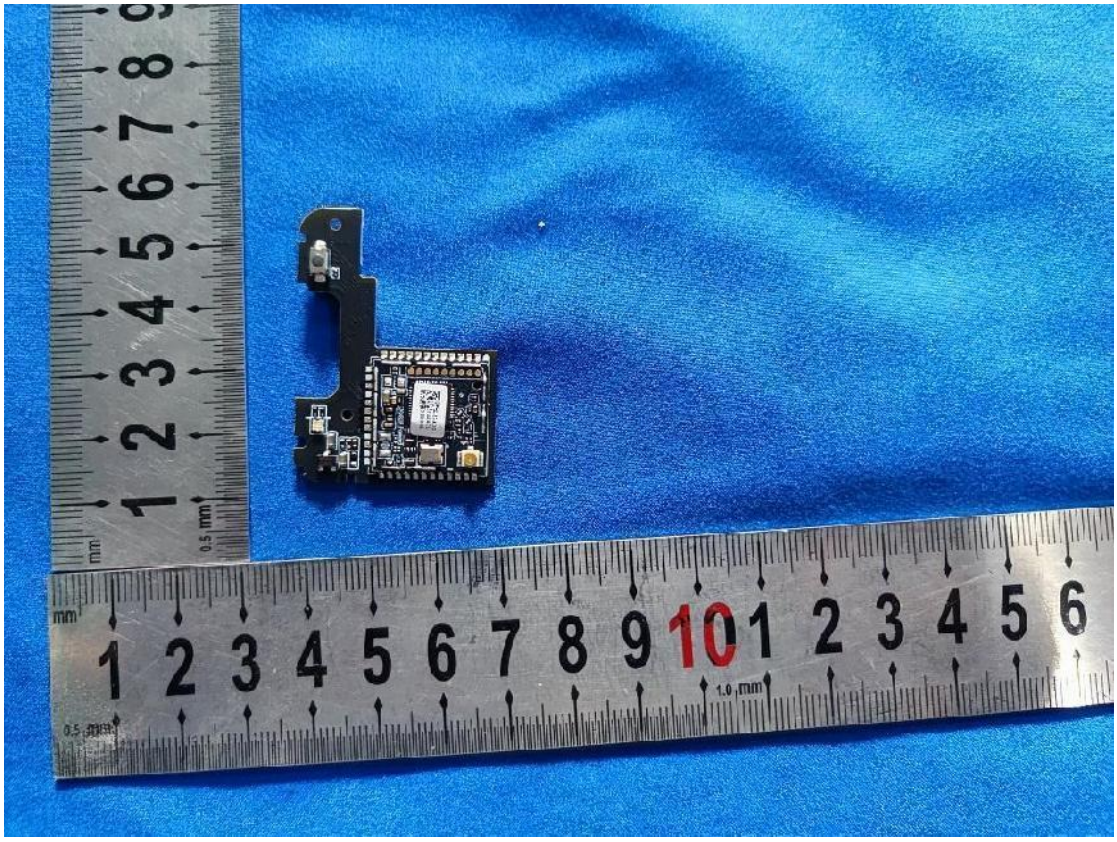


Photo 4: PCB view

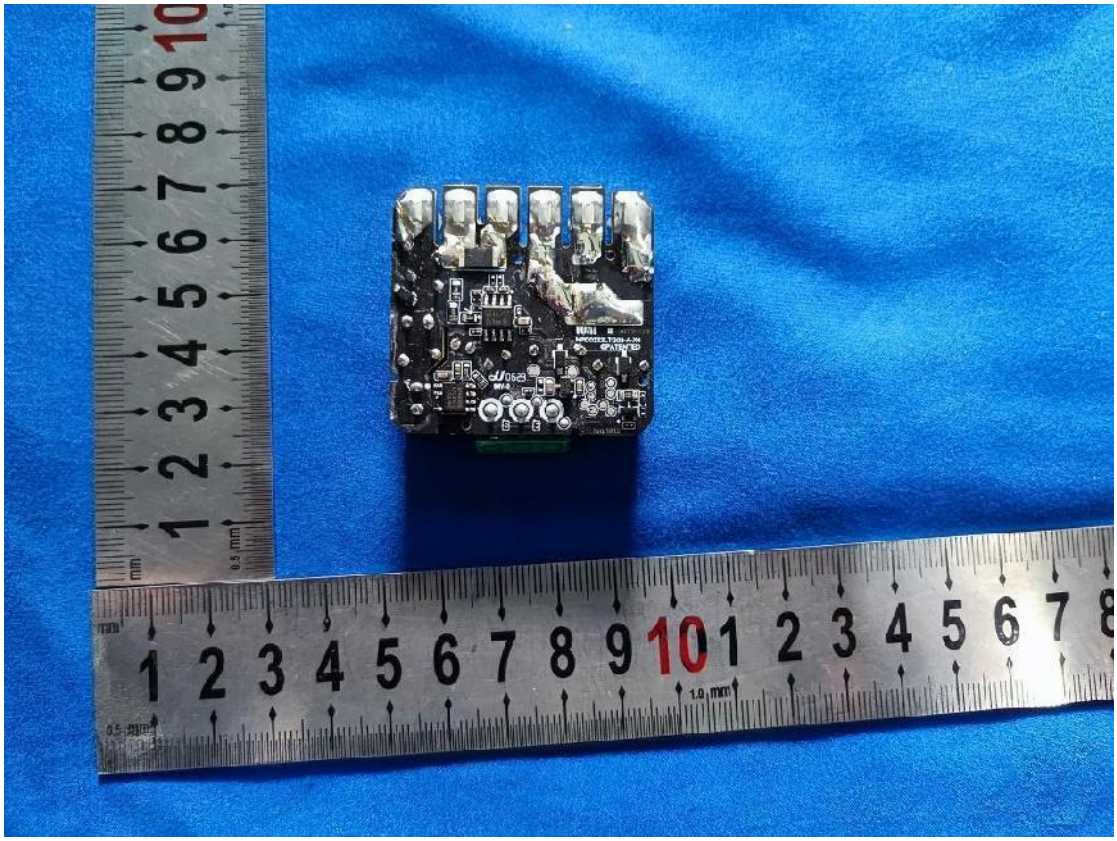


Photo 5: PCB view

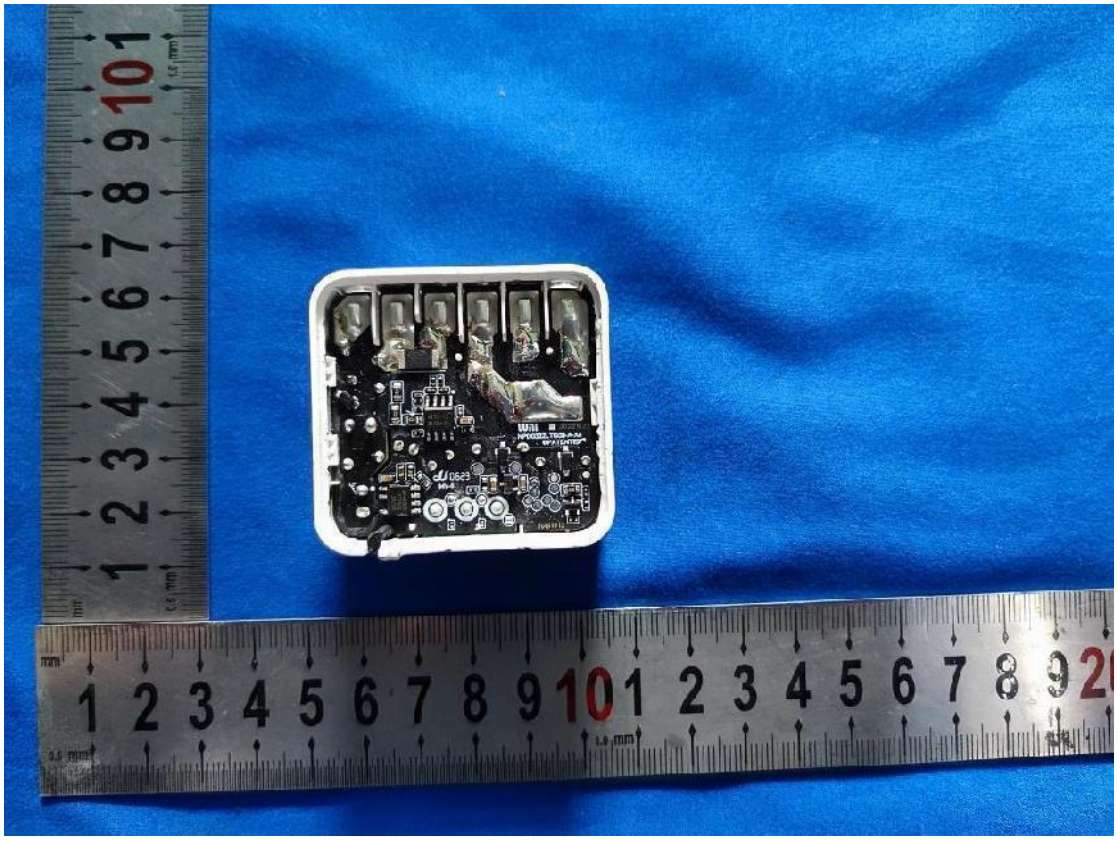


Photo 6: PCB view

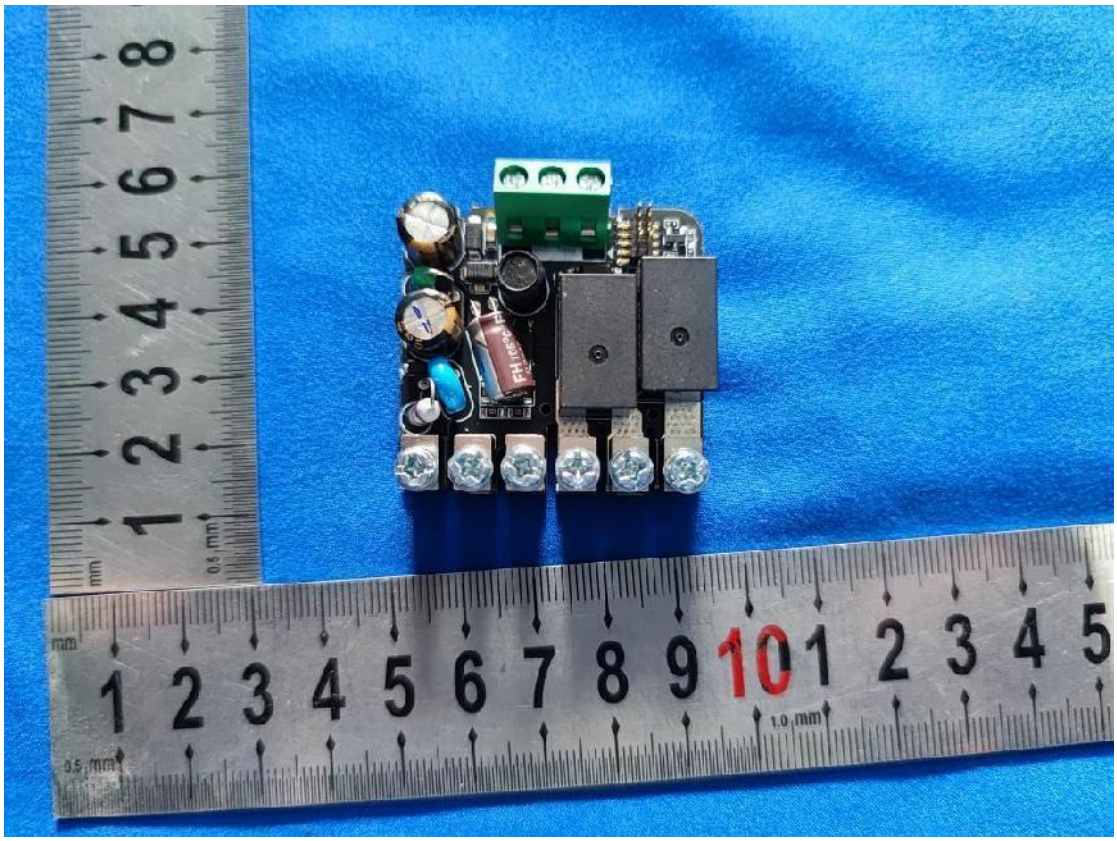
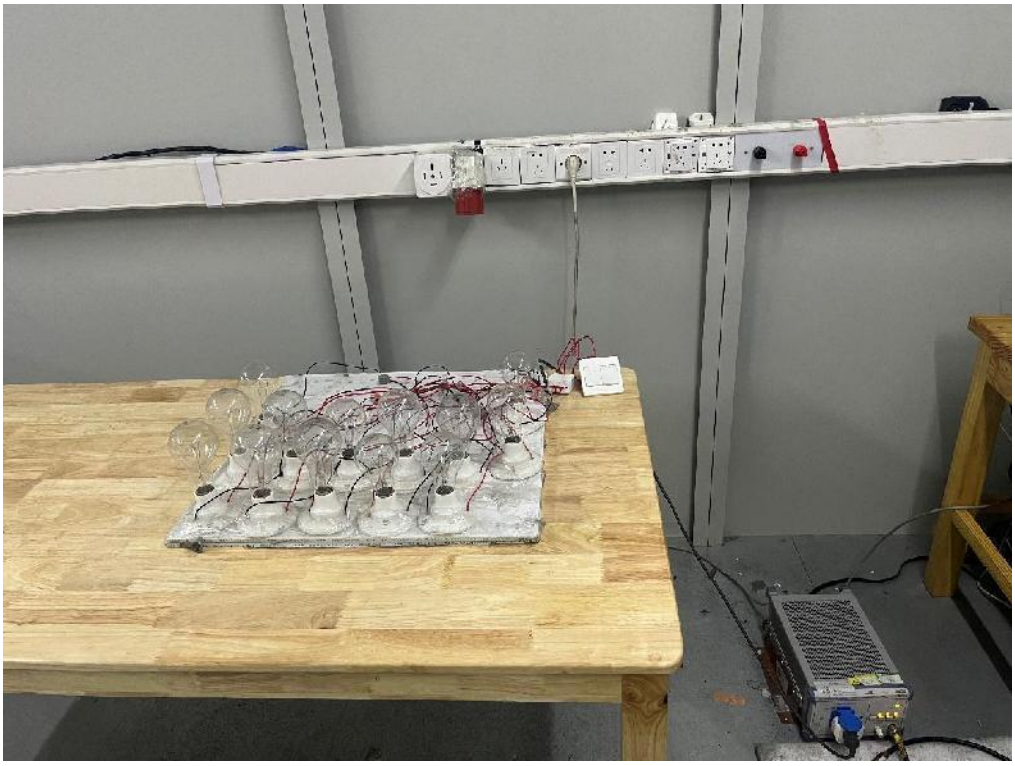
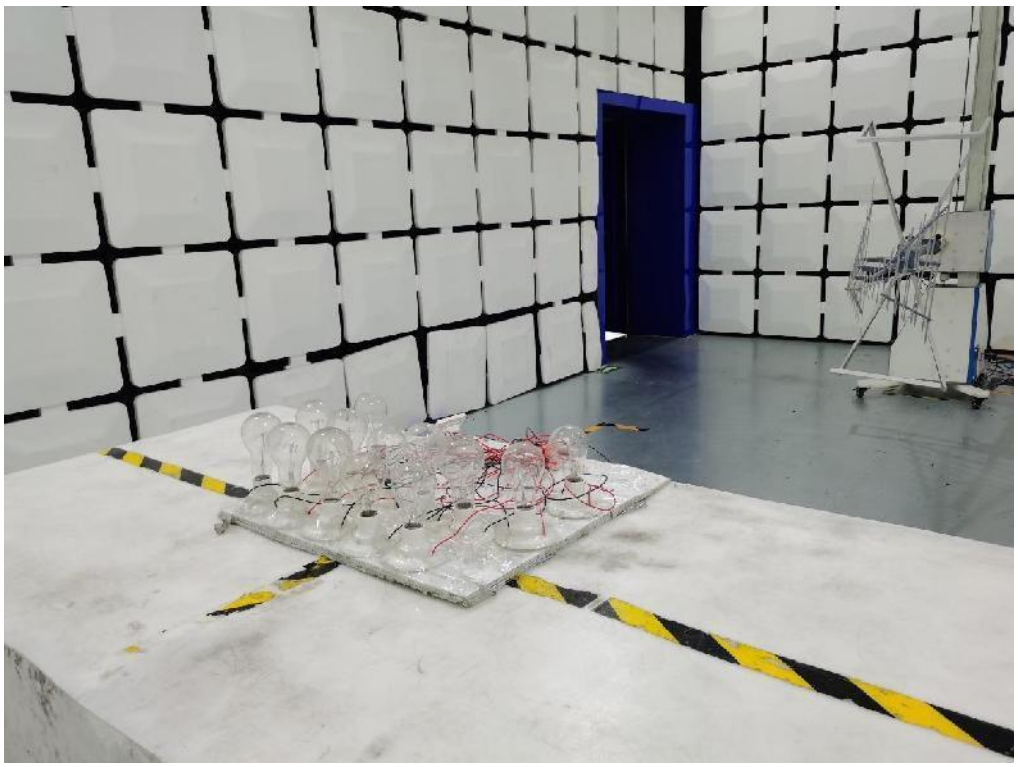


Photo 7: PCB view

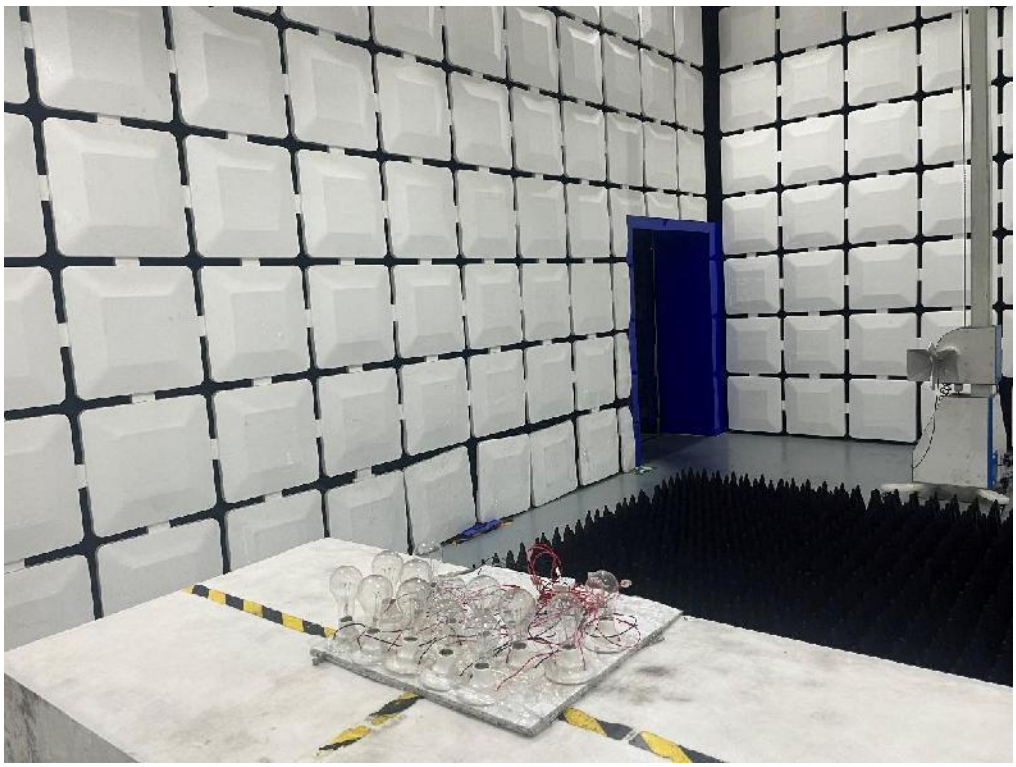
APPENDIX B: PHOTOGRAPH OF THE TEST ARRANGEMENT



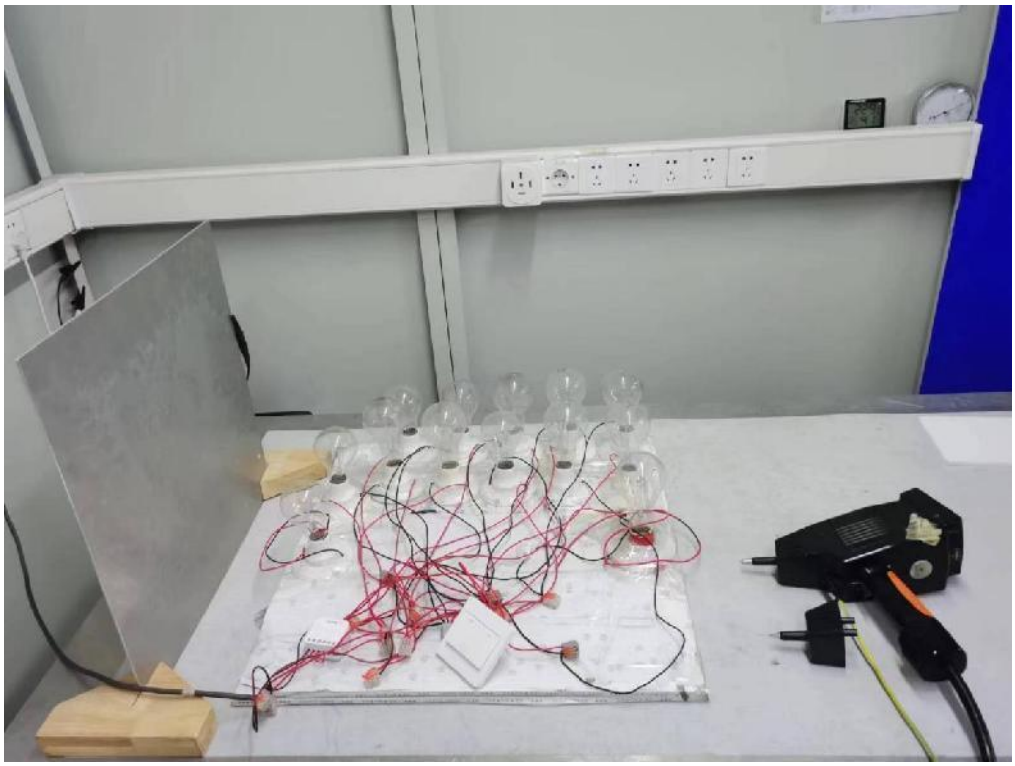
CE (AC mains)



RE (30M~1GHz)



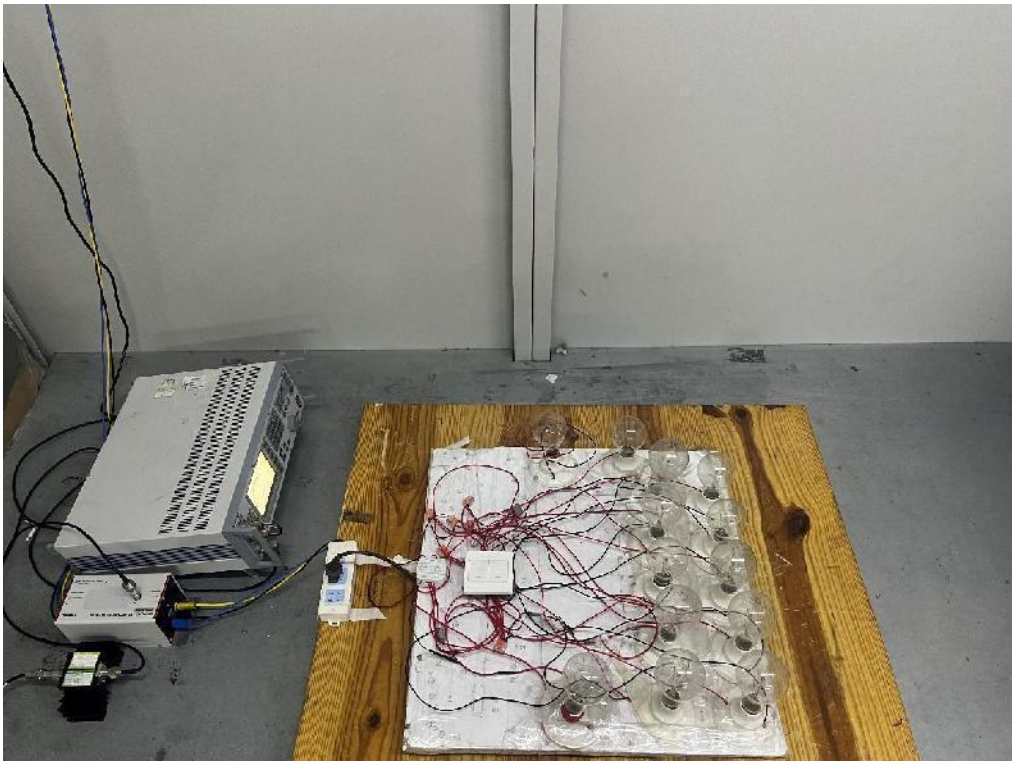
RE (1G~6GHz)



ESD

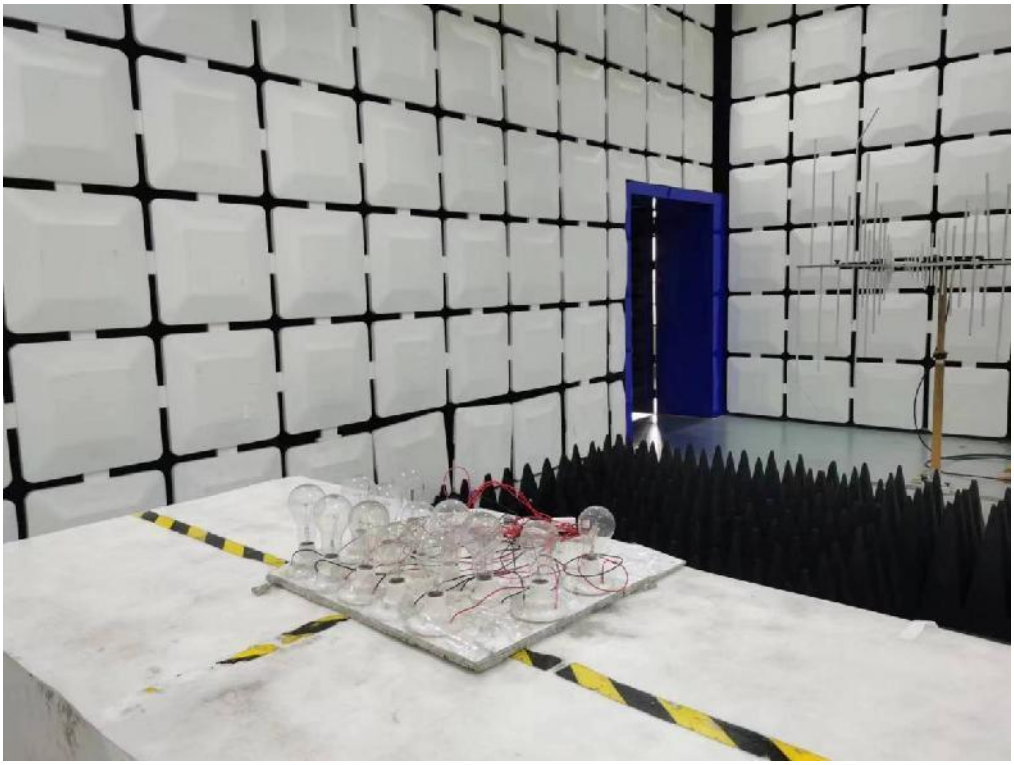
EFT (AC mains)

SURGE (AC mains)

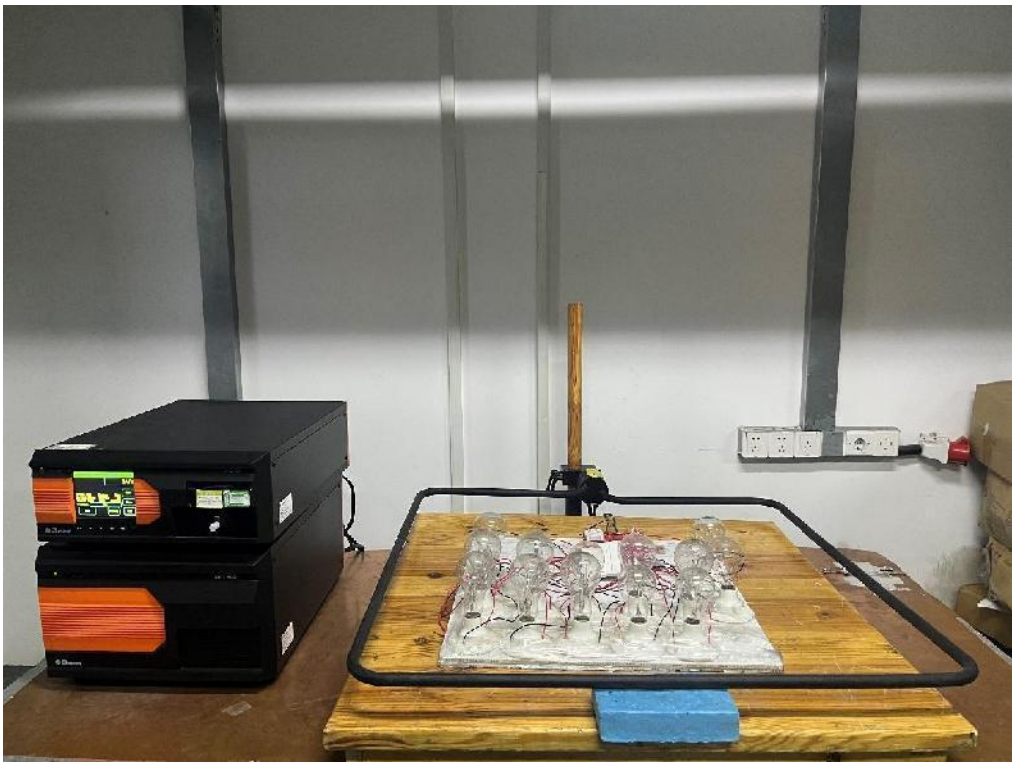


CS (AC mains)

DIP & H & F



RS



PFMF

APPENDIX C: PERFORMANCE CRITERIA

General Requirements (EN 55035)

Criteria A	During and after the test the EUT shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a minimum performance level specified by the manufacturer when the EUT is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the EUT if used as intended.
Criteria B	After the test, the EUT shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomena below a performance level specified by the manufacturer, when the EUT is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is allowed. However, no change of operating state or stored data is allowed to persist after the test. If the minimum performance level (or the permissible performance loss) is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the EUT if used as intended.
Criteria C	During and after testing, a temporary loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls or cycling of the power to the EUT by the user in accordance with the manufacturer's instructions. Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

General Requirements (ETSI EN 301489-1):

The performance criteria are used to take a decision on whether radio equipment passes or fails immunity tests.

For the purpose of the present document four categories of performance criteria apply:

- performance criteria for continuous phenomena applied to transmitters and receivers;
- performance criteria for transient phenomena applied to transmitters and receivers;
- Performance criteria for equipment which does not provide a continuous communication link;
- Performance criteria for ancillary equipment tested on a stand-alone basis.

Normally, the performance criteria depend on the type of radio equipment. Thus, the present document only contains general performance criteria commonly used for the assessment of radio equipment. More specific and product-related performance criteria for a dedicated type of radio equipment may be found in the part of EN 301 489 series dealing with the particular type of radio equipment.

Performance criteria for continuous phenomena applied to transmitters and receivers

If no further details are given in the relevant part of EN 301 489 series dealing with the particular type of radio equipment, the following general performance criteria for continuous phenomena shall apply.

During and after the test, the apparatus shall continue to operate as intended. No degradation of performance or loss of function is allowed a permissible performance level specified by the manufacturer when the apparatus is used as intended. In some cases this permissible performance level may be replaced by a permissible loss of performance.

During the test the EUT shall not unintentionally transmit or change its actual operating state and stored data.

If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be deduced from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.

Performance criteria for transient phenomena applied to transmitters and receivers

If no further details are given in the relevant part of EN 301 489 series dealing with the particular type of radio equipment, the following general performance criteria for transient phenomena shall apply.

After the test, the apparatus shall continue to operate as intended. No degradation of performance or loss of function is allowed below a permissible performance level specified by the manufacturer, when the apparatus is used as intended. In some cases this permissible performance level may be replaced by a permissible loss of performance.

During the EMC exposure to an electromagnetic phenomenon, a degradation of performance is, however, allowed. No change of the actual mode of operation (e.g. unintended transmission) or stored data is allowed.

If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be deduced from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.

Performance criteria for equipment which does not provide a continuous communication link

For radio equipment which does not provide a continuous communication link, the performance criteria described in clauses 6.1 and 6.2 are not appropriate, in these cases the manufacturer shall declare, for inclusion in the test report, his own specification for an acceptable level of performance or degradation of performance during and/or after the immunity tests. The performance specification shall be included in the product description and documentation. The related specifications set out in clause 5.3 have also to be taken into account.

The performance criteria specified by the manufacturer shall give the same degree of immunity protection as called for in clauses 6.1 and 6.2.

Performance criteria for ancillary equipment tested on a stand-alone basis

If ancillary equipment is intended to be tested on a stand alone basis, the performance criteria described in clauses 6.1 and 6.2 are not appropriate, in these cases the manufacturer shall declare, for inclusion in the test report, his own specification for an acceptable level of performance or degradation of performance during and/or after the immunity tests. The performance specification shall be included in the product description and documentation. The related specifications set out in clause 5.3 have also to be taken into account.

The performance criteria specified by the manufacturer shall give the same degree of immunity protection as called for in clauses 6.1 and 6.2.

Special Performance Requirements (ETSI EN 301489-17):

The performance criteria are:

- performance criteria A for immunity tests with phenomena of a continuous nature;
- performance criteria B for immunity tests with phenomena of a transient nature;
- performance criteria C for immunity tests with power interruptions exceeding a certain time.

The equipment shall meet the minimum performance criteria as specified in the following clauses.

EN 301 489 -17 Performance criteria		
Criteria	During Test	After test
A	Shall operate as intended (see note 1) Shall be no loss of function Shall be no unintentional transmissions	Shall operate as intended Shall be no degradation of performance (see note 3) Shall be no loss of function Shall be no loss of stored data or user programmable functions
B	May show loss of function (one or more) May show degradation of performance (see note 2) Shall be no unintentional transmissions.	Functions shall be self-recoverable Shall operate as intended after recovering Shall be no degradation of performance (see note 3) Shall be no loss of stored data or user programmable functions
C	May be loss of function (one or more)	Functions shall be recoverable by the operator Shall operate as intended after recovering Shall be no degradation of performance (see note 3)

Note 1: Operate as intended during the test allows a level of degradation not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

Note 2: Degradation of performance during the test is understood as a degradation to a level not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance.
If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

Note 3: No degradation of performance after the test is understood as no degradation below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. After the test no change of actual operating data or user retrievable data is allowed. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

Performance criteria for Continuous phenomena applied to Transmitters (CT)

The performance criteria A shall apply.

Tests shall be repeated with the EUT in standby mode (if applicable) to ensure that unintentional transmission does not occur. In systems using acknowledgement signals, it is recognized that an ACKnowledgement (ACK) or Not ACKnowledgement (NACK) transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

Performance criteria for Transient phenomena applied to Transmitters (TT)

The performance criteria B shall apply, except for voltage dips of 100 ms and voltage interruptions of 5000 ms duration, for which performance criteria C shall apply.
Tests shall be repeated with the EUT in standby mode (if applicable) to ensure that unintentional transmission does not occur. In systems using acknowledgement signals, it is recognized that an acknowledgement (ACK) or not-acknowledgement (NACK) transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

Performance criteria for Continuous phenomena applied to Receivers (CR)
The performance criteria A shall apply.
Where the EUT is a transceiver, under no circumstances, shall the transmitter operate unintentionally during the test. In systems using acknowledgement signals, it is recognized that an ACK or NACK transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

Performance criteria for Transient phenomena applied to Receivers (TR)
The performance criteria B shall apply, except for voltage dips of 100 ms and voltage interruptions of 5000 ms duration for which performance criteria C shall apply.
Where the EUT is a transceiver, under no circumstances, shall the transmitter operate unintentionally during the test. In systems using acknowledgement signals, it is recognized that an ACK or NACK transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

--END--